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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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Amdahl Cuts Prices

Howard A. Karten
CW Staff

VALE, Calif. — Amdahl ... week made price cuts of approximately 9% for the most common configurations of all models in its 470 series of large-scale systems.

The announcement followed by one month IBM's price reduction on its memory systems. At that time, Amdahl spokesmen said their firm would probably not reduce its memory prices because the reduction "would not be that significant in terms of the cost of the whole system" [CW, Dec. 11].

Despite that statement, however, the company has dropped its memory prices by nearly 18%, from $170,000 for 2M bytes of memory to $140,000. The cuts apply to the company's 470V/5, 470V/5-II, 470V/6, 470V/6-II and 470V/7 as well as the 470V/8, which is scheduled for September delivery.

At the new prices, the cost of Amdahl systems will range from $1,840,000 for an entry-level 470V/5 to $4,010,000 for the largest mainframe, the 470V/8, the spokesman said.

The cuts may have been motivated by the anticipation of IBM's E series systems, whose announcement is

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Severe Paper Shortage Confronts Big DP Users

By Brad Schultz
CW Staff

A severe paper shortage is hurting the nation's largest DP users, limiting their supply of output paper as well as keypunch cards.

Even paying premium prices for the paper is not assuring its delivery, users told *Computerworld* recently. The users seemed convinced that suppliers simply do not have the paper to deliver because of West Coast mill strikes, a shortage of capital to improve production, constraints imposed by environmental legislation and because of the worldwide rise in demand for wood products, especially paper.

The paper shortage appears to be hitting the biggest users the hardest, according to CW's annual budget survey [CW, Jan. 8]. Eleven of the 34 survey respondents reported DP budgets exceeding $2 million, and seven of those 11 named supplies in general or paper in particular as the area in which costs rose the most in 1978.

Overall, 15 respondents designated "supplies/paper" as a major problem area.

Suppliers contacted by CW agreed with the users' assessment of the situation. Moore Business Forms, Inc., a major supplier of DP business forms, had received 12% to 15% of its raw paper from West Coast mills before the strikes started last summer. It has subsequently seen its inventories drop by roughly the same amount, according to associate marketing director Murray Crowe.

Many users suspected that the last severe paper shortage, in 1974, was deliberately caused by the paper manufacturers, according to Jim H. Barry, operations supervisor for Hazelwood, Mo.-based Schnuck Markets, Inc. The users surmised that production was intentionally cut as a pretext for hiking prices as high as the traffic could bear, he explained.

In contrast, Barry and other DP managers believe the present shortage — which reportedly began in the last quarter of 1978 — is genuinely out of the manufacturers' control. Some have expressed sympathy for the paper industry's predicament; they have cooperated with delivery cuts as steep as 50% from initial orders, realizing that many consumers are prone to hoarding paper goods in anticipation of continued scarcity.

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IBM Enhances Two Small Systems

• *System/34 Extended*

By Jeffry Beeler
CW Staff

ATLANTA — IBM's string of small business system enhancements continued last week when the firm's System/34 family received eight previously unavailable features, including increased terminal support.

Besides support for up to 16 Model 5250 CRT terminals, the major enhancements include an expansion feature that reportedly improves the performance of magnetic ink character recognition (Micr) equipment and the addition of software support for Synchronous Data Link Control (SDLC) and IBM 3270 synchronous communications.

The remaining enhancements for the System/34 include Cobol extensions for workstation data management and interactive communications, additional macro instructions for the System/34 assembler and macro processor licensed program, system support program modifications and workstation utility improvements.

CRT Support Doubled

IBM credited the workstation control expansion feature with providing additional microcode that doubles the number of CRT terminals supported by the small business system. These eight additional terminals — which can include

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• *Another Series/1 CPU*

By Jeffry Beeler
CW Staff

ATLANTA — IBM gave its Series/1 users a belated season's greeting last week when the firm added 10 enhancements, including a processor, to that line.

Some of the key product additions for Series/1 users include a bottom-of-the-line processor that provides increased packaging densities compared with other Series/1 CPUs, two disk units and an attachment feature that for the first time allows the small business system to support IBM's Model 5250 CRT workstations.

IBM also announced a multiline attachment feature that allows users to program independently the communications features of up to eight transmission lines, the reclassification of its Event-Driven Executive (EDX) as a licensed program, a Fortran IV compiler and object-support library, a mathematical and functional subroutine library, a command language for the Real-Time Programming System Version 4 and Version 4 of a program preparation subsystem.

Increased Packaging Density

Summarizing the details of last week's enhancements, IBM credited its latest Series/1 processor — the Model 4952 — with packing a CPU, clock comparator, a storage address

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ACLU Files to Halt Mandatory ID Cards

By Ann Dooley
CW Staff

NEW ORLEANS — The American Civil Liberties Union (ACLU) has filed suit in federal district court here to stop seven Louisiana counties from requiring itinerant workers to carry special identification cards. The ACLU class action suit charges that the cards, ostensibly adopted to keep out "undesirables," infringe on the workers' constitutional rights.

The watchdog organization is afraid the information on the cards could be misused in a variety of ways. That information is reportedly being fed into police computers that are linked to state and federal data banks, both to check for criminal records and for future retrieval, according to Gretchen Hollander, ACLU area director.

The information could appear in a number of data banks — both public and private — where it does not belong, Hollander said. "The possibilities of misusing that information with a computer are endless," she added.

A recent state law empowers seven parish (county) governments to fingerprint and issue special identification cards to transient workers who come to the area looking for work in the sugar cane or oil fields. Officials cited a number of homicides, one of which was believed to have been committed by an itinerant farm worker, as the reason for the law. In that particular case, the suspect's guilt could not be determined since he was later killed "while resisting arrest" in another state. Even so, local residents strongly supported passage of the measure.

Implemented in One Parish

Only one of the seven counties, St. Mary's Parish, has implemented the law so far. But St. Mary's has gone a step further by requiring any person who changes jobs in the county to obtain an ID card, thereby assuring that almost everyone in the county will eventually be registered.

In addition to a fingerprint of the worker's right index finger, each ID card — which costs the worker $10 — contains his photograph and detailed information including his race, occupation, physical description and the names and addresses of his mother, father and siblings as well as his Social Security and driver's license numbers.

A full set of fingerprints is kept on file by the sheriff's office.

At least 3,000 people have registered for the card since St. Mary's Parish adopted the ordinance in November. While a worker can refuse to obtain a card, employers of unregistered workers can be fined heavily; as a result, employers have been adhering to the law and workers — if they want to find a job — must register for the cards.

The ACLU filed its class action suit, representing both employers and employees, contending that the new law

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Among 15 Replies to FCC

Cbema Argues Against OK of ACS

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – AT&T's Advanced Communications Service (ACS) is "the sheerest attempt to ignore Federal Communications Commission [FCC] rules and definitions and to mask the true nature of the service by use of communications terminology," according to the Computer and Business Equipment Manufacturers Association (Cbema).

In prepared comments on ACS filed with the FCC, Cbema said the approval of ACS would result in "an unprecedented extension of regulation into the presently competitive marketplace for DP services."

The Cbema views were among replies filed with the FCC by about 15 parties interested in AT&T's ACS application. That application has asked the commission for a declaratory ruling favoring the proposed service – a move that would enable the Bell System to avoid preparing a full so-called 214 submission which, among other things, would require a detailed cost and rate analysis.

Digital Equipment Corp. urged the FCC to approve the AT&T request for a declaratory ruling stating that "ACS satisfies a long-standing need, will promote competition in the computer industry and is desired by those who would make use of it." DEC further said ACS would allow users to select terminal equipment based on features and would reduce worries about incompatibility problems and other "artificial constraints" introduced by "host computer suppliers."

Since ACS will support a wide variety of otherwise incompatible equipment, it will help users avoid being locked in by the constraints imposed by some equipment vendors, DEC suggested.

Tymnet, Inc., which operates a network that has features similar to those proposed for ACS, told the commission that it should reject the application because AT&T "attempted to distort the commission's procedures and sought approval without providing the [required] information."

Tymnet called attention to other instances in the past when Bell had used its monopoly power to try to prevent competition. It further claimed that "substantially all of the services which AT&T alleges it will provide are available today from Tymnet."

CCIA Views

The Computer and Communications Industry Association (CCIA) said ACS definitely includes DP services and features that could even be used by customers for data base purposes.

The CCIA contended that AT&T's argument for retaining these features – that they would be "inefficient" for such and, therefore, as a practical matter would not be used – is spurious.

FCC concurrence with AT&T's reasoning on this point would mean there is no longer any "meaningful or practical distinction whatsoever" between communications and data processing, the association said.

FCC approval of ACS would also suggest that "any data processing services would be within the purported scope of FCC regulation, despite the FCC's lack of jurisdiction" over the DP industry, the CCIA maintained.

Basically, the association said, ACS is a "hybrid data processing service" consisting of a packet-switched data communications service and an electronic message service." ACS should be restricted to the packet network and not be extended to electronic message services, the CCIA said. In addition, the packet-switched service should be offered through a separate and independent subsidiary.

AT&T is cloaking ACS' DP aspects in "novel terminology," the CCIA filing continued, by saying that "transmission" of a customer's message occurs "when it leaves the user's ACS node." Actually, "no message . . . can be processed by ACS until it is transmitted from the user's terminal to the ACS node. Therefore, users of ACS perform a very substantial amount of DP subsequent to initial transmission."

Accordingly, the CCIA concluded, "the ACS node represents the central

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Estimates of Power of IBM's E Series Hiked

NEW YORK — Previous projections of the power of the expected IBM E series of computers [CW, June 4] appear to have been too conservative, according to the Technology Analysis Group (TAG) at Advanced Computer Techniques Corp. here.

Members of the E series, which is expected definitely within this quarter and possibly later this month, should offer users two and a half to three times the performance per dollar of the 370 models 115, 125, 138, and 148 which they will replace, TAG now predicts.

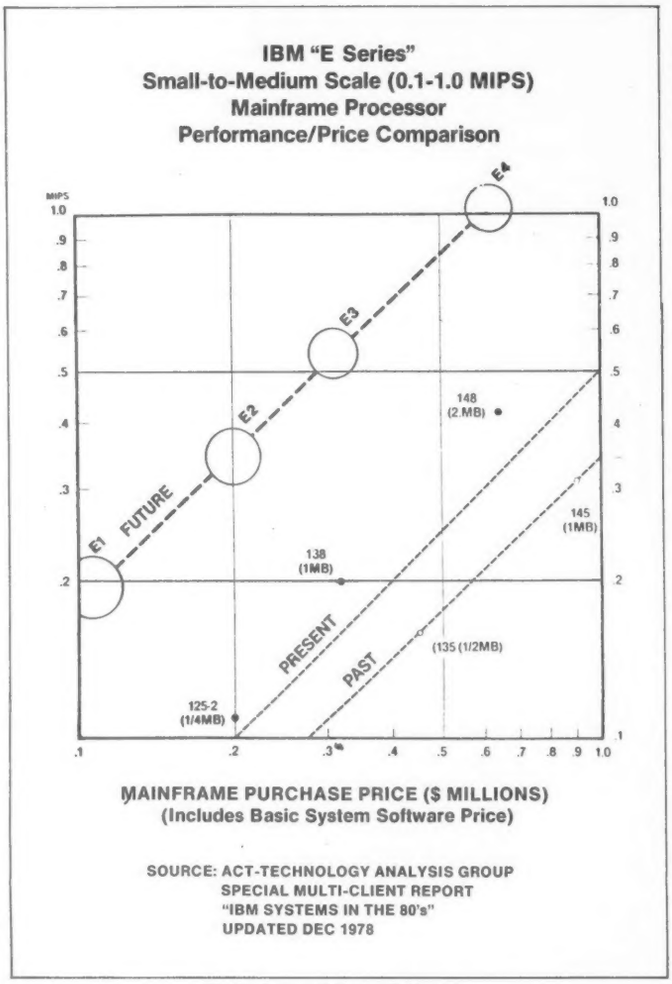
The latest projections are based on an analysis of recent IBM announcements, particularly those of the 8100 information system and the System/38, and the increased performance of those systems.

The accompanying chart shows purchase price for the expected E series mainframes, which includes the processor, main storage, microcode, standard features and console display, but excludes all other I/O devices. The price of the basic system software — i.e., the nucleus of the operating system — is included. However, language processors, data base/data communications, utilities, conversion aids and application software are not included.

TAG believes all other software will cost, on the average, approximately 25 to 35% of the system purchase price, depending on configuration size, over a five-year period (60 months of software license fees).

The chart shows, for example, that the E2 or E3 represent logical migration paths for the current IBM 370/-138 customer. The Model 138 presently has a performance of about 210 thousand operations per second (Kops), with a mainframe price of more than $300,000.

A comparable E2, therefore, will offer 300 to 400 Kops at a price of approximately $200,000, whereas the E3 will provide approximately 500 to 600 Kops at a price nearly equivalent to that of the Model 138, TAG predicted.



TAG's Latest E Series Estimates

Other models and their E series counterparts are illustrated. The circles indicate "ballpark" raw performance per dollar forecasts; these can vary within a range depending on final pricing decisions by IBM management.

TAG cautioned, however, that while the raw Kops-per-dollar ratios are of some value when comparing mainframes that utilize the same operations/functions, the overall system performance could be substantially different because of operating system software differences and I/O channel capability, as well as other functional improvements.

Robert T. Fertig, director of TAG, believes, however, that the advanced functions offered by the E series will be the most "revolutionary" part of their announcement.

Unlike the Series 30 and System/38, shipments of the E series processors should commence almost immediately, with deliveries 30 to 90 days from announcement time, TAG said. The impact of this announcement on IBM used computer prices and market should also be substantial, the group noted.

Amdahl Reduces Prices of 470s

(Continued from Page 1)

expected later this month (see Page 4), as well as IBM's price cuts on memory, according to Harry Edelson of Drexel Burnham Lambert, Inc., a New York investment firm.

Edelson speculated that Amdahl's delay in announcing the cuts was probably a result of a desire to study the market to learn how customers would react to such a move.

Still another possibility is that the company is seeking to "deflate the impact" of the E series — the top end of which is expected to compete with products in the IBM 370/148 performance range, he said.

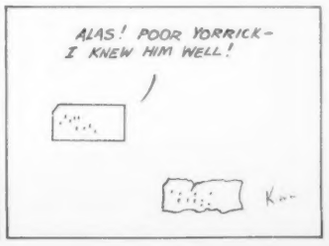
More Cuts Expected

Robert Fertig, director of the Technology Analysis Group at Advanced Computer Techniques Corp. in New York, thinks "Amdahl may have to lower prices again in the latter part of 1979 or early in 1980" to remain competitive with IBM's E series. "If there is [in fact] an overlap between the lower end of the Amdahl line and the E series, Amdahl will be forced to lower prices again."

Fertig also predicted an erosion of IBM memory prices in the future to which Amdahl and other IBM competitors will have to react defensively. "If Amdahl is to be competitive in coming years, it will have to become a total systems competitor instead of just a mainframe supplier. We think Amdahl will have to supply the software, the support and plug-compatible peripherals and terminals.

"One possibility is that since Amdahl is cash-rich, it may acquire one of the plug-compatible peripheral companies and/or software companies. I believe that's going to happen," Fertig said.

Fertig noted that his company had anticipated Amdahl's move in recent presentations to Wall Street analysts.



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Judge Responds to Critics

Antitrust Cases Hard to Expedite: Edelstein

By Connie Winkler
CW Staff

NEW YORK — When the rubber meets the road, overseeing a complex antitrust case isn't as easy as some critics might think, according to Judge David N. Edelstein, who's been hearing the U.S. vs. IBM case for four years.

This view came in a formal 10-page letter written by Edelstein in direct response to a case study of complex litigation published recently by Ohio State law professor Peter M. Gerhart.

Gerhart's study, the "Preliminary Report on the Empirical Case Studies Project," was almost entirely incorporated in another report now available in a 363-page draft form but due to be released later this month in Washington by the National Commission for the Review of Antitrust Laws and Procedures.

Both reports say judges need to take the bull by the horns early in complex antitrust proceedings such as the IBM case, which was one of 32 Gerhart examined.

"Judges, in our view, are in the best position to ensure that litigation is expedited," the commission's draft says. "They have the ability and, we believe, the responsibility to see that issues are focused, that discovery is streamlined, that delaying tactics are avoided and that issues are addressed as soon as they are reasonably framed."

The commission recommends limiting discovery and setting as many time limits as possible. (Discovery is the process by which, through legal procedures, both sides learn the contours of the other's case.)

The report also makes major recommendations for the legal determination of monopolization and of relief. If implemented, these could drastically affect future antitrust litigation.

Judges Not Only Problem

The commission, however, was not oblivious to concerns such as those voiced by Edelstein in his letter to Gerhart. Because of the demands the IBM trial has placed on Edelstein, Gerhart did not interview the judge.

"While stronger judicial management and control may be the single best solution for unreasonably protracted cases, judges clearly are not the sole cause of the problem," the draft states. It then discusses financial and other reasons for delay such as lawyer excesses and then includes Gerhart's specific suggestions for controlling complex cases.

"All 13 judges and all the lawyers I interviewed agreed that unless both parties have the incentive and ability to expedite a case, it is essential that the judge take active control if the case is to be expedited," Gerhart said. The preliminary report says the judge should:

- "Take control of the case at an early point, before disputes arise."
- "Meet frequently, following a prearranged schedule."
- "Decide all issues as promptly as the nature of the issue permits."
- Make himself easily accessible to the lawyers.

Edelstein, in his letter to Gerhart, contended the preliminary report focuses too much on judicial control "as being the *sine qua non* in expediting cases.

"Regrettably, your excessive emphasis on judicial control can be misleading, since it diverts attention from numerous significant factors not readily amenable to the control of the court," the judge wrote. Economic and other motives that can greatly affect proceedings should have been dealt with more adequately in the report, Edelstein added.

The judge also argued that certain monopolization cases, such as U.S. vs. IBM, encompass the life history of the corporation and industry. And, although "judicial intervention may sharpen the issues and perhaps focus the dispute . . it does not diminish the need for a broad inquiry into the power and practices of a large corporation in a major industry."

Response on Judicial Control

Edelstein also responded to Gerhart's specific urgings for judicial control with the following observations:

- No matter how good and/or strong the intentions and incentives supplied by the court to expedite a case, lawyers can be intransigent.
- It is best that the judge remain flexible rather than follow a set schedule. "I opt for the 'open door policy' as being the most effective means of bringing disputes to the surface and resolving them."

Giant cases brought by the government also move slowly, Edelstein said, because of the higher requisite that all matters be public and that records be publicly available.

The judge argued that in trying to decide issues promptly, he is hamstrung by lack of resources. A judge's small staff, he said, isn't equipped to deal with the huge support staffs of the litigants who use different lawyers (relay teams) for each witness.

The judge, who has been sitting alone on the case since the trial began May 19, 1975, objected that although discovery must be controlled, that control

(Continued on Page 6)

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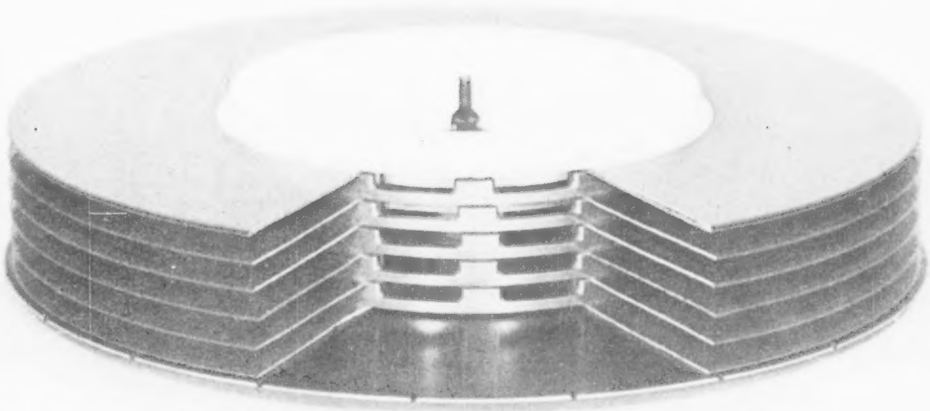

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9

Edelstein Says Antitrust Cases Hard to Speed

(Continued from Page 5)

must be within the federal rules of procedure and those rules currently provide for broad discovery. "Large-scale and time-consuming discovery in major antitrust cases is unavoidable if the parties are to have their day in court," he said. In the IBM case, Edelstein has so far accepted 10,000 documents.

Written Narratives

In the letter, Edelstein also explained his recent expediting technique whereby witnesses submit direct testimony in a written statement which is negotiated by both parties before the witness takes the stand. The narratives have been remarkably successful in the IBM case, reducing what would have taken several months of court time to one month.

Beyond Gerhart's findings, the commission report explores the mission presented by President Jimmy Carter in his 1977 executive order: to make recommendations for the revision of procedural and substantive rules of antitrust law needed to expedite complex antitrust cases; recommendations for more effective remedies; and recommendations on antitrust immunities such as exist now in the surface transportation industry.

Further Recommendations

The draft proposes greater sanctions against lawyers who deliberately delay cases and recommends the award of prejudgement interest so that interest would be awarded on damages from the date of the initial complaint instead of the judgement date.

The commission further recommends changing one of the proof standards under Section Two of the Sherman Antitrust Act by which a firm can be found a monopoly. The two key legal elements now are a specific intent to monopolize and a "dangerous probability of success."

The commission urges that the "dangerous probability" proof standard be changed to a "determination of whether the defendant has significantly threatened the maintenance of competition."

The commission also strongly recommends that when a company is found to be monopolizing its industry, structural relief be implemented immediately.

"Despite . . . repeated admonitions, structural relief has seldom been ordered in Section Two cases," the commission comments. "This reluctance appears in large measure to have grown out of a belief on the part of some courts that structural relief is punitive or overly harsh and that relief directed at conduct alone is sufficiently effective in dissipating illegal market power."

If adopted, this relief recommendation could affect the IBM case because the government has yet to say what it is seeking from IBM.

Industry Groups Respond To Bell's Proposal on ACS

(Continued from Page 2)

computer in a remote access data processing service, which performs word processing and many other types of programmed manipulation of data within messages (i.e., data processing) subsequent to initial transmission of such data from the user's terminal."

The Association of Data Processing Service Organizations (Adapso), which described its members as "vitally interested in and directly affected by the availability and competitive effects of new communications service offerings," proposed that the FCC hold off on an ACS ruling until completion of the current Second Computer Inquiry.

"The classification of the various elements of ACS as either data processing or communications under the present computer rules" might "serve to prejudge the issues and proposed rules under consideration" in that inquiry, Adapso said.

"Were, for example, the commission to classify ACS as communications common carriage under the present computer rules and were AT&T, in reliance upon that classification, to invest substantial funds installing ACS, the commission might find itself hard-pressed to negate its prior action by adopting a new and perhaps preferable rule," the association said.

Deferral Not Prejudicial

A temporary deferral of the ACS proposal by the FCC would possibly allow completion of the Computer Inquiry to render moot the questions raised by the AT&T offering. Such a deferral would not be "unduly prejudicial" to AT&T because "relevant ACS materials are not now and apparently will not soon be ready for consideration by the commission," according to Adapso, which added that "AT&T has indicated that ACS tariff data will not be available until much later this year."

One of the more interesting arguments put forward in the public comments came from the CCIA, which concluded its argument by saying "in the broader policy perspective," ACS should be considered "in light of higher priorities necessary for the nation's dominant supplier of communications common carrier services, particularly the maintenance and development of basic voice and data transmission services.

Capital Absorbed?

"The optimum development of such services may well absorb or even exceed AT&T's available capital for the foreseeable future."

The comments filed here last week were in response to an AT&T reply to the FCC, which had requested more information on ACS.

The new service was originally proposed to the commission last July 10 [CW, July 24]. At the urging of several interested parties, the FCC subsequently asked AT&T approximately 150 questions concerning the possible DP aspects of its proposal and requested more economic data concerning the ACS offering.

ACLU Fighting Identity Cards

(Continued from Page 1)

violates the rights to freedom of travel, to privacy, to equal protection under the law and to unrestricted interstate commerce.

A pretrial hearing has been scheduled for Jan. 19 to hear an ACLU request for an injunction that would halt the use of the cards until the case can be tried.

Checks on Fugitives

Although St. Mary's Parish officials and parish lawyer Ed Leonard have declined to comment on the matter because it is currently in litigation, officials originally stated that the personal information would be used to run computer checks to determine if an individual was a fugitive from the law.

While the authorities now say they have never run any of the information through the computer, the ACLU's Hollander said that doesn't make sense because that was their stated purpose for the registration.

The idea behind the cards was to intimidate people so they wouldn't come into the area, she maintained, adding that parish residents wanted to stop the "wrong kind of people" from residing in St. Mary's.

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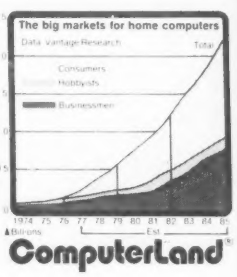

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But Fate of Fedsim Undecided

Two Software Support Units Moved to GSA

By Don Leavitt
CW Staff

WASHINGTON, D.C. — The long debate over who in the government should oversee three specialized DP support units climaxed last week with a decision to move both the Federal Cobol Compiler Testing Service (FCCTS) and the Federal Conversion Support Center (FCSC) to the General Services Administration (GSA).

Both had been receiving nominal support from the Department of the Navy, under whose aegis they operated.

The third support unit — the Federal Computer Performance Evaluation and Simulation Center (Fedsim), currently managed by the Air Force under contract to GSA — will be temporarily retained in the Department of Defense (DOD) until its "proper location" can be determined.

These decisions were announced in letters sent by Wayne G. Granquist, associate director for management and regulatory policy at the Office of Management and Budget (OMB), to Fred Wacker at DOD, Frank Carr at GSA and Jordan Baruch at the Commerce Department.

The letters ended a long debate during which OMB's federal DP reorganization project sought and got lots of advice and counsel.

Both Carr, who runs GSA's Automated Data and Telecommunications Service, and Baruch, assistant secretary of Commerce for Science and Technology, had argued the merits of their respective organizations as the logical home for these specialized DP support units [CW, Aug. 28, Sept. 11].

Quick Relocation

In his letters, Granquist said FCCTS and FCSC should be relocated "as quickly as possible" and later added that OMB Director James T. MacIntyre Jr. "asked that we implement this decision within 90 days."

Granquist told his addressees he was seeking their cooperation in forming a "working-level implementation team" with representatives from their organizations as well as from OMB "to identify the actions that will be necessary to accomplish the transfer."

One of the actions presumably will be to draft a new "memorandum of understanding" among the various agencies to define how the units will aid them in their responsibilities for procurement and effective use of government DP equipment. The memorandum under which FCCTS now operates will be outdated with the organization's shift from DOD to GSA.

In connection with Fedsim, Granquist said MacIntyre had set a one-year deadline to decide where it belongs and told Carr, Baruch and Wacker he would appreciate their views on the "appropriate organizational placement of Fedsim and any related issues" that should be considered "in light of the FCSC and FCCTS organizational decisions."

Factors in Decision

In his letters, Granquist said the decisions had been made only "after careful consideration of the very complex questions and available options." He spelled out half a dozen factors which OMB weighed in its determination.

The testing of manufacturers' compilers and the review of agency software conversion proposals are most closely related to the procurement control functions of GSA, Granquist said. Relocation of FCSC and FCCTS would enhance the procurement process for ADP and provide additional skills to assist GSA in its exercise of central procurement, he added.

Further, "an immediate relocation of FCSC should help solve the problem of getting it operational quickly," Granquist asserted. This was tacit recognition that the Navy, which had given the center its initial encouragement, had effectively abandoned it, particularly since the whole placement debate got under way.

Paper Organization

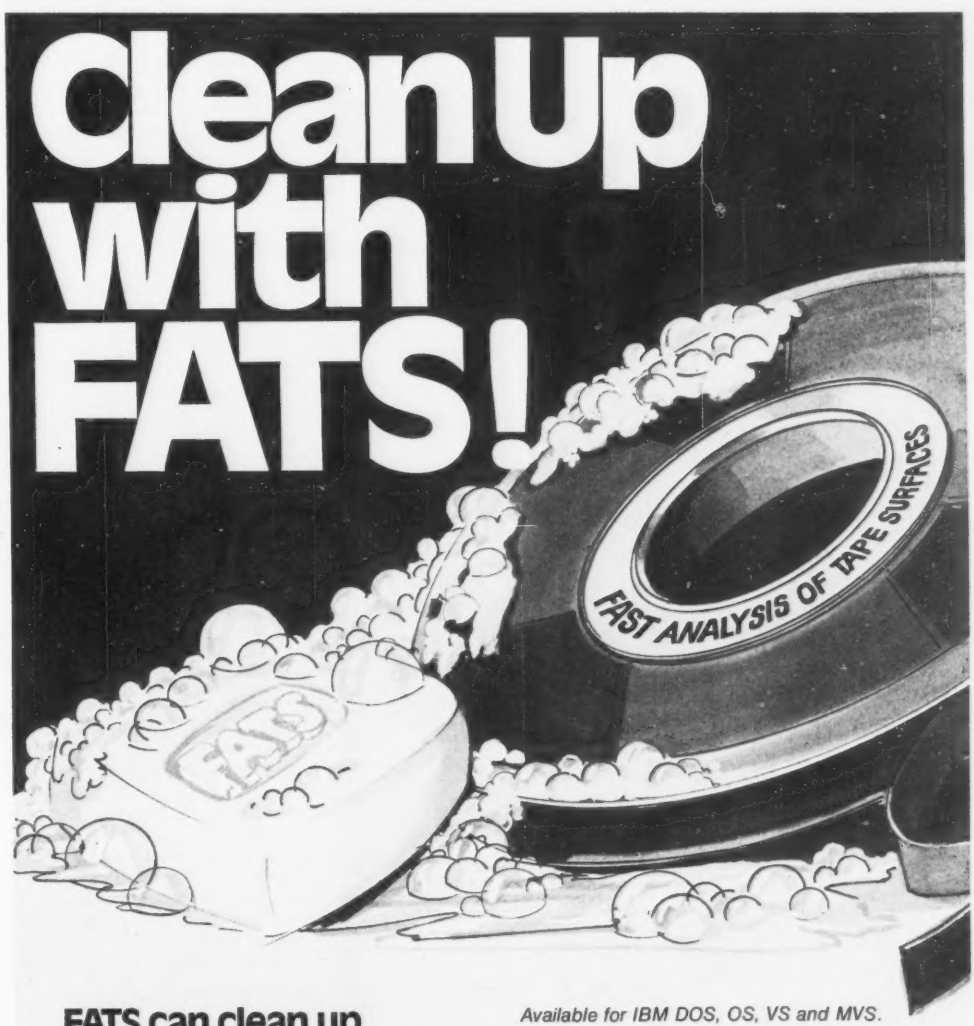
At the moment, FCSC is a paper organization headed by Paul Oliver, who is concurrently director of FCCTS — also a Navy-backed activity — but who has resigned both posts effective in mid-February.

Switching subjects, the OMB spokesman noted that the analysis of issues pertaining to reassignment of Fedsim is incomplete and its transfer at this time could be disruptive to projects currently under way with several user agencies.

Deláying a decision on Fedsim, however, would not have any significant adverse consequences, he contended.

Discussing the relocation plan after the letters were sent, Granquist's assistant, Wally Haase, noted that the talents of the people at FCCTS and FCSC had quite rightly been recognized as useful to the standardization and ongoing support functions of Commerce as well as to GSA's procurement work.

One reason Baruch was included in the group that received Granquist's letter was to reassure him and his colleagues in the Commerce Department that FCCTS and FCSC skills would be available to them.



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Additional CPU Among Series/1 Enhancements

(Continued from Page 1)

relocation translation function and a full complement of main memory on one 7- by 9-in. printed circuit board. One of the Series/1's earliest processors, by contrast, requires six boards to provide roughly the same computing capabilities as the 4952, according to an IBM spokesman.

IBM achieved this six-fold increase in packaging densities partly by replacing the 2K-bit memory chips used in other Series/1 processors with 36K-bit memory chips, eight of which fit on a 1 sq-in. memory module. By placing one or more of these modules on the 4952's lone processor card, users can expand their systems in 32K-byte increments from 32K to 128K bytes without consuming additional CPU chassis space.

With earlier Series/1 processors, on the other hand, users can expand main storage capacity only by inserting whole memory boards and thus using card slots that might otherwise be allotted to I/O controllers.

IBM also attributed the 4952's increased packaging densities to an improved logic design in which each logic module incorporates two chips instead of one, as in older Series/1 processors.

With the introduction of the 4952, the Series/1 processor family now consists of three members, including the larger models 4953 and 4955. The 4952, which comes in two versions — with five or 14 I/O slots — executes instructions in an average of 9.4 microsec, operates with a 2 microsec memory cycle and provides 20% less processing and 200 nsec machine cycle power than the 4953.

A basic 4952 processor consisting of a 32K-byte CPU, storage address relocation translation feature, clock comparator, power supply and half- or full-width rack costs $4,600, with each 32K-byte memory increment selling for an additional $450. IBM will begin shipping the processor in May.

Two Disk Subsystems

In other Series/1 enhancements, IBM expanded its 4963 disk subsystem line with the introduction of a 23M- and a 29M-byte unit. Previously, the 4963 family consisted of just a 58M- and a 64M-byte model.

Both the 23M- and 29M-byte units attach to the Series/1 through the 4963 disk subsystem Attachment Feature No. 3590. They are available either as single-drive units or as part of a subsystem with up to three identical- or mixed-capacity drives, IBM said.

Both additions to the 4963 disk subsystem family access in an average of 27 msec, transfer data at 1.03M bytes/sec and provide an average rotational delay of 9.6 msec.

A 23M-byte Model 23A primary disk unit with a 131K-byte fixed-head capacity costs $9,980, while each Model 23B expansion system costs an additional $8,280. A 29M-byte Model 29A primary disk unit with a 131K-byte fixed-head capacity sells for $9,260, compared with $7,560 for each additional Model 29B expansion unit. All four will be available next month.

Another of last week's Series/1 additions, the Model 5250 Attachment Feature No. 1210, provides four ports that reportedly allow workstations already available to System/34 and System/38 users to connect to the Series/1 through twin-axial or coaxial cables. Terminals accommodated by the attachment include the 5251 models 1 and 2 CRT stations, the 5252 Model 1 dual-display station and the 5256 models 1, 2 and 3 printers.

Available next December, the attachment will cost $2,950, with software support available for an $18/mo license charge.

Other Enhancements

Most of the other Series/1 enchancements — including the EDX support, Fortran IV compiler and object support library, mathematical and functional subroutine library and the additional command language for the Real-Time Programming System Version 4 — will be ready for shipment this May.

The EDX software, which has been upgraded from a Field Developed Program to an IBM-warranteed product, ranges in price from $12 to $80, depending on the features selected.

The Fortran IV compiler and object-support library, meanwhile, carries a $14/mo license fee and reportedly uses a precompile syntax-checking mode to cut compile times by an unspecified amount. IBM will provide the mathematical and functional subroutine library for an $8/mo license charge and has repriced the additional command language from $38 to $49.

Version 4 of the program preparation subsystem carries a $24/mo license fee and will become available this April. The feature-programmable multiline attachment costs $1,380 and is slated for shipment this September.

With the multiline attachment, users can program the line speed, line operation mode, stop-bit length, parity and similar features of CRT terminals and other teletypewriter-compatible peripherals, the spokesman said.

Severe Paper Shortage Hits

(Continued from Page 1)

Yet the experience has been frustrating. As DP manager Angelo Bommarito of Florists Transworld Delivery (FTD) in Southfield, Mich., put it, "We've got the best means of communications — the world's fastest computers — and yet we can't get it on paper."

About six months ago, FTD ordered 50,000 rolls of terminal paper at a cost of $120,000 from Moore Business Forms for the floral delivery service's IBM-based communications network, called Mercury. FTD has received only 25,000 rolls so far, Bommarito said.

Moore "is feeding it to us as fast as they can" and "we're distributing it as fast as we can get it" to 18,000 network members, he added.

Adding to the Problem

Two user trends compounding the shortage problem are the growth of distributed data processing networks and the computerization of small businesses. These trends compel users to switch to new types of paper goods or at least to redesign existing forms, Moore's Crowe explained.

Along with these DP trends, the growth in publishing and other paper-consuming industries has "overbooked" many paper distributors. "There's just not enough equipment around to [match] the demand right now," according to marketing representative Jack Molloy of Paper Sales Corp., a distributor for International Paper Co.

"Probably there will be no relaxation of the problem until 1981, unless there is a recession," Molloy predicted, explaining that several large-scale paper production machines will be introduced at that time.

The paper industry has not been immune to inflationary effects such as rising equipment and labor costs, he pointed out. One mill recently committed $180 million toward production upgrades — a sum not many other mills can match.

Crowe is more optimistic. He said many DP users could improve efficiency while reducing paper demand by redesigning forms or minimizing the need for duplication of paper files through administrative consolidation.

Users can decrease their paper dependence by increased use of computer output microfilm or disk and magnetic tape media for record storage, Crowe suggested. Yet punch card prices have continued to climb despite the declining usage of cards in favor of on-line, real-time processing.

The paper industry does seem limited in what it can do to beef up supplies, Crowe admitted. Importing paper would simply add to consumer costs; recycling generally yields a grade of paper that is unacceptable for many DP applications; and synthetic paper has not yet proved practical, he said.

IBM System/34 Gains Features

(Continued from Page 1)

the 5252, 5256, or 5251 models 1 and 2 — attach to the System/34 via the "cable-through" Feature No. 2680.

IBM enhanced its System Support Program Interactive Communication Feature (SSP-ICF) with the addition of SDLC support for System/34 processor-to-processor communications. The support will become available in January 1980 with no additional monthly license fee.

IBM also enhanced the SSP-ICF with IBM 3270 binary synchronous communications support that is said to provide a program-to-program interface. With the additional support, System/34 application programs for the first time can use 3270 protocols to communicate at 9,600 bit/sec with host systems, the spokesman said.

Like the SDLC support, the 3270 feature and the System/34 Cobol extensions will become available in January 1980 with no additional monthly license charge. The Cobol extensions, which support terminal operations and SSP-ICF, have eliminated CALLS to assembler routines, IBM said.

All the remaining System/34 enhancements — including the additional macro instructions for the system's assembler and macro processor licensed program, the system support program modifications and the workstation utility improvements — will become available this July at no extra cost.

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Post Office, Pitney Bowes Project

CPU Tie Automates Postage Meter Resetting

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C — The U.S. Postal Service and Pitney Bowes, Inc. recently unveiled a system that enables companies to reset their postage meters via a telephone-to-computer hookup.

At a recent press conference held here to introduce the Remote Meter Resetting System (RMRS), Postmaster General William F. Bolger claimed the system offers a "significant" increase in convenience to the postage meter user. About 30.6 billion pieces of mail were meter-stamped last year, representing revenues of $6.1 billion for the Postal Service and accounting for more than 37% of all mail volume, he said.

Denise Staresina, overall coordinator of the RMRS project for Pitney Bowes, demonstrates how the system is used to transfer additional funds to customers' postage meters over a computer-linked telephone.

As explained by Pitney Bowes Chairman Fred. T. Allen, RMRS customers telephone a special computer center, now being established by the company in Stamford, Conn., and give the code information requested by a computer-activated voice response unit. If the data is accurate and acceptable, the user is issued a "unique resetting number to credit his meter with an amount of postage drawn from a predeposited trustee bank account," Allen said.

This "unique resetting number" activates a special unlocking mechanism and credits the customer's meter with either $200 or $2,000, depending on the amount he chooses. The system requires a special meter, which is available on a lease basis for about $3 more than comparable meters without the RMRS facility, Allen noted.

The computer center verifies the data and checks the status of the customer's balance at the trustee bank, to which he has previously made a deposit for postage. It then provides the customer with the combination to add postage to the meter.

After notification of the transaction by Pitney Bowes, the customer's account at the trustee bank is charged, and the bank wires payment for the postage directly to the Postal Service's Federal Reserve account. The company said it is currently working with the Hartford (Conn.) National Bank and the Mercantile Bank of St. Louis to set up trustee accounts for its RMRS customers.

With a toll-free phone call, the customer accesses the Pitney Bowes computer center. The codes — unique to each meter — are entered on a Touch-Tone phone or keypad available from Pitney Bowes. The system verifies the input information, checks the customer's trust account and then provides the lock combination if everything is in order.

Allen said his company will charge $5 per transaction, which he defined as one phone call to use the system during which the customer can request as many combination codes as he wishes, up to the balance of his trustee account. The Postal Service now charges $7 for on-site meter resetting, he added. Meters can be reset without a service charge at a post office.

Two-Year Trial Service

Announcement of the Pitney Bowes system came after a two-year trial service in Connecticut involving 176 companies, including Honeywell, Inc. and GTE Sylvania. Denise Staresina, coordinator of the Pitney Bowes RMRS project, said the companies were enthusiastic about the system "once they tried it."

According to Staresina, the company's data center, which will use Tandem Computers, Inc. equipment, will be operational by March. Allen estimated between 5,000 and 10,000 companies will be using the RMRS system by the end of 1979. There are currently abut 755,000 postage meters in use in the U.S. today, he added.

Because of a short supply of the special RMRS meters, the company is beginning its marketing regionally, Allen said, but the system should be available throughout the U.S. by summer.

Allen pointed out that under the terms of the agreement between the Postal Service and Pitney Bowes, the company "has offered to license its patents, trade secrets and know-how concerning its new meter system to all Postal Service-authorized postage meter manufacturers for use in the U.S. on terms that are fair and reasonable."

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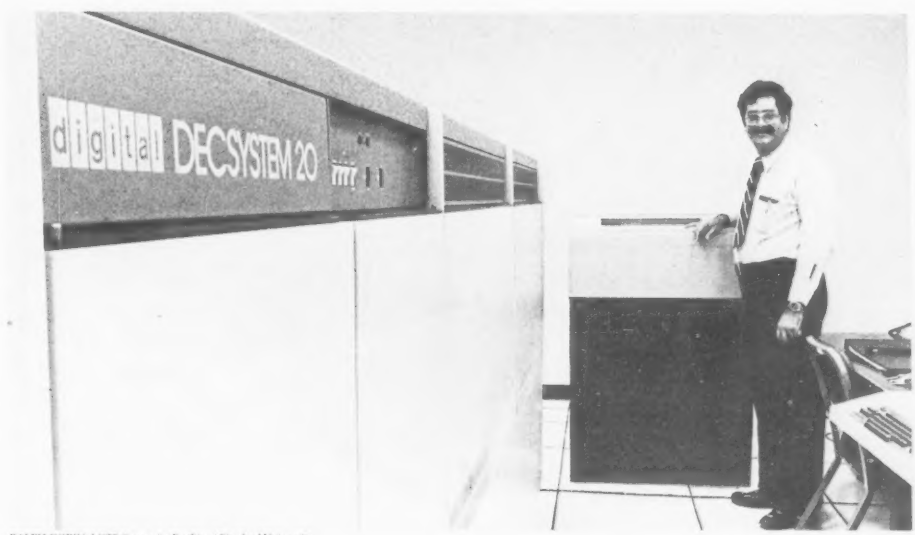

RALPH GORIN, LOTS Computer Facility at Stanford University

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Mob Got Data From Police Group: FBI Files

By Tim Scannell
CW Staff

SACRAMENTO, Calif. — Highly sensitive data on organized crime has been leaked to the underworld for almost 20 years by certain members of a privately chartered police intelligence organization that has computerized ties to more than 250 law enforcement agencies throughout the U.. and Canada.

La Cosa Nostra, the Mafia and crime syndicate figures have been receiving confidental material since 1960 from some members of the Law Enforcement Intelligence Unit (LEIU), according to Federal Bureau of Investigation files on the group. The LEIU was formed in 1956 by a handful of California police groups to facilitate the intrastate exchange of information on organized crime activities.

The leaked data reportedly ranges from police statistics on criminal traffic and reputed mobsters to stolen FBI dossiers detailing underworld racketeering.

The FBI files, recently obtained by a Philadelphia law student under the Freedom of Information Act, revealed that the Pueblo, Colo., chapter of the LEIU handed data to reputed crime figures in the early 1960s. The files also showed that an intelligence specialist with the Las Vegas, Nev., LEIU branch gave confidential police information to gang members as recently as September 1978.

Both the Pueblo and Las Vegas chapters as well as about 10 other police departments are currently or were at one time suspended from the intelligence-gathering group on corruption charges, according to LEIU general chairman Maj. Steven Bertucelli of the Dade County, Fla., public safety department.

"From time to time, if you work in the business of investigating organized crime, the problem of corruption does come up," Bertucelli stated. "A number of agencies have found themselves involved in corrupt activities and have had some of their personnel doing things they shouldn't be doing, but that is peculiar to about any law enforcement agency or any security group that works in this field."

The computerized system is reportedly protected by certain "security access procedures" which include an automatic purging step and several "audit trails," Bertucelli said.

The LEIU has a built-in "self-policing mechanism" that "works most of the time," he added, but indicated the organization cannot guarantee that all of its information is totally secure. "I'd like to say it's a 100% clean, but I haven't yet seen any business that is.

"The prime issue seems to be that the LEIU is a private organization and thereby not controlled by anyone — but that's not true." Bertucelli explained. "We probably have more controls than anyone."

LEIU members access the organization's California-based computer by telephoning the headquarters here and requesting specific information. An operator working on a terminal keys the inquiry into a Data General Corp. minicomputer and reads back any material that appears on the CRT screen to the inquiring police department.

The LEIU is basically a pointer or indexing service rather than a dossier-type set-up. "It is essentially a coordinating function that puts agencies in contact with one another to continue investigations or focus on the movements of some [criminally] organized people . . . and facilitates an information exchange with state and local law enforcement units across the country," Bertucelli said.

However, a number of civil rights activists — including members of the American Civil Liberties Union (ACLU) — claim not only that the LEIU is insecure and ineffective, but that it also violates basic civil rights by collecting material for its intelligence files on civil rights activists, black organizations, antinuclear groups and other associations without ties to organized crime.

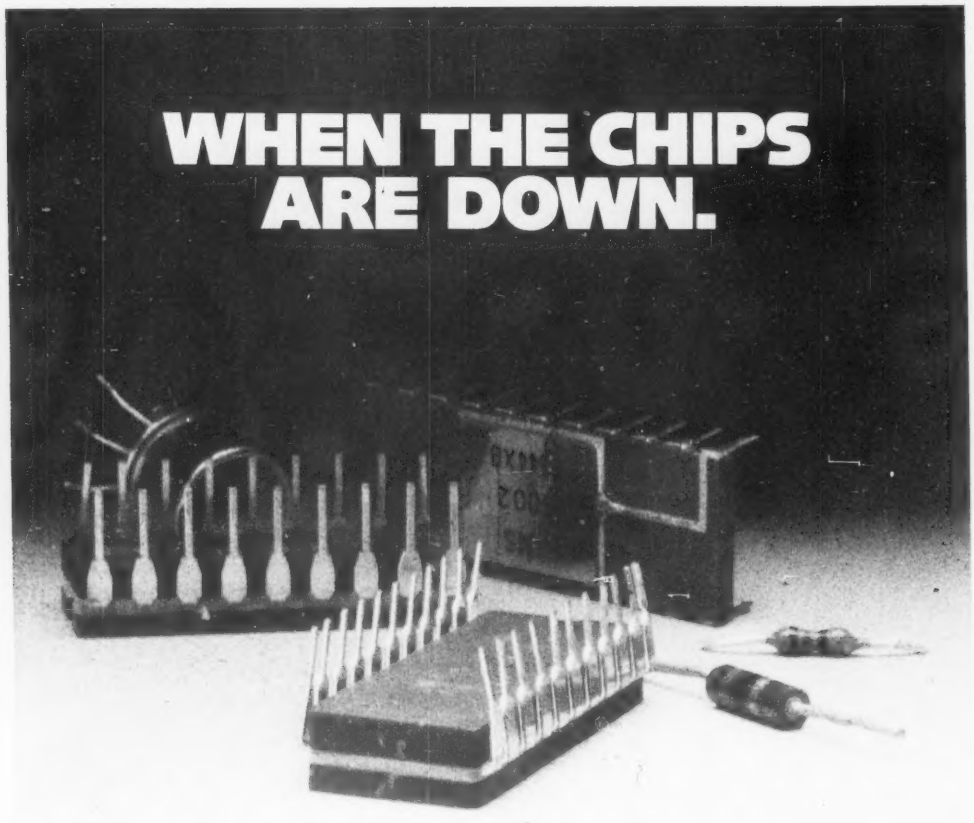
The ACLU has reportedly filed several legal suits charging a number of LEIU-affiliated police agencies with maintaining detailed dossiers on private citizens.

Bertucelli denied that the LEIU is currently compiling any kind of file or computerized data base on any private citizen or organization without an organized crime connection. He did admit, however, that the law enforcement support group at one time collected such data.

"During the late '60s, information was gathered in regard to Black Panther organizations or dissident groups involved with violent activities," he acknowledged. But "obviously that era has passed, so we've been going through a purging process of removing those people that don't apply anymore."

The LEIU's general chairman believes the ACLU overreacted because a few police members were slow to purge their files. The ACLU's position "is that there should be no intelligence at all, and our position is that if we don't have it, then law enforcement really can't do its job," he asserted.

The LEIU is presently funded by its police membership, but the Law Enforcement Assistance Administration picked up the tab for the organization's computer operation until June of this year, Bertucelli said, when funding was dropped because of "a policy decision."



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Managers on the Move

JOHN H. SALIBA has been elected an assistant vice-president of National Grange Mutual Insurance Co. in Keene, N.H. He will be responsible for the development and maintenance of the company's manual and automated systems.

Prior to his election, Saliba had been the firm's corporate systems coordinator.

He is a graduate of the University of Vermont in Burlington and holds a B.A. degree in economics.

• • •

ADRIANO J. CARBONARO has been promoted to vice-president of data processing at O'Boyle Tank Lines, Inc. in Washington, D.C.

Carbonaro joined O'Boyle in 1974 as manager of the DP department. He was previously employed by General Electric Co.'s Systems Division.

• • •

PATRICIA WIER has been named to a newly created executive vice-president position at Encyclopedia Britannica's U.S.A. Division in Chicago.

Wier will become executive vice-president of administration.

Wier was first named a vice-president in 1975, when she was given responsibility for accounting, cost control and computer operations.

She is an alumna of the University of Missouri at Kansas City and holds an MBA from the University of Chicago.

• • •

PETER A. WOLFARTH has been appointed manager of information systems for Domtar Gypsum America, Inc. in Oakland, Calif.

Wolfarth previously held computer operations management positions at the Rucker Co., Rocor International and ISI Corp.

He holds a degree in business administration from Manteufel Business College in Wiesbaden, Germany.

• • •

BRADFORD SWEET has been appointed director of corporate management information systems for American Optical Corp. in Southbridge, Mass.

Sweet joined American Optical in 1966. He formerly served as manager of information systems for the Optical Products Division.

Sweet holds a bachelor of arts degree in business administration from Nichols College and has done graduate work at Clark University and Worcester Polytechnic Institute.

• • •

RICHARD L. BLAND has joined Giffels Associates, Inc. of Southfield, Mich., as director of computer services.

Carbonaro Bland

Bland was previously the data center services manager for Black & Veatch Consulting Engineers of Kansas City.

He holds a B.S. in civil engineering from the University of Kansas and a M.S.C.E. from the University of Missouri.

• • •

STARR D. WHEELER has been named corporate manager of information systems at Archon, Inc., a subsidiary of Iroquois Brands, Ltd., based in Greenwich, Conn.

Prior to joining Archon in 1973, she was director of management information services at OCE Industries, Inc., a business equipment company, and systems supervisor of Bell & Howell, Inc.

Wheeler holds a bachelor of science degree from Wilmington College, where she majored in business administration. She also attended the University of Cincinnati Graduate School of Business and completed computer language courses at IBM and Honeywell, Inc.

• • •

ROBERT A. DEROUNIAN has been appointed manager of network systems and programs at Schlegel Corp. in Rochester, N.Y.

Derounian was previously employed as manager of systems development for Ragu Foods, Inc. and as director of management information systems for R.F. Communications. He attended Hofstra University.

Wheeler Wolfarth

• • •

PAUL PAVLOFF has been appointed vice-president of management information services for Champion International Co. in Hamilton, Ohio.

Prior to joining Champion International in 1969, Pavloff was director of management information systems planning for Columbia Broadcasting Systems, Inc. in New York City and held management positions at U.S. Steel Corp. in Pittsburgh.

He received a bachelor of business administration degree in accounting from the University of Pittsburgh.

• • •

BERNARD A. RENOIS and DENNIS F. ROBINSON have been appointed to assistant secretary positions in The Hartford Insurance Group's DP department in Hartford, Conn.

Renois will be responsible for the loss reporting systems of the department's Claims Services Division.

Renois is a graduate of City College of New York and holds a master's degree from George Washington University.

Robinson will be responsible for the daily systems within the corporate claims processing system. He has been a systems manager since 1976.

Robinson is a graduate of the University of Hartford.

• • •

Saliba Wier

ERNEST L. ANGER JR. has been appointed manager of DP operations at Bay State Abrasives in Westborough, Mass. He will be responsible for DP operations, routing and coordination of the company's telecommunications and data security activities.

He is a graduate of Wentworth Institute in Boston.

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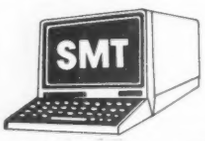

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Final Guides Expected by July

OECD Work on Transborder Data Pleases U.S.

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The U.S. is pleased with recent efforts by the Organization for Economic Cooperation and Development (OECD) to produce international guidelines for transborder data flow and the protection of personal data and privacy, a State Department spokesman said.

A December OECD meeting favorably received draft guidelines that "reflect pretty much the U.S. point of view" on transborder data flow, according to Morris H. Crawford, director of the State Department Office of Science and Technology Affairs.

The draft guidelines, put together by Dr. Peter Seiple, Swedish computer law expert and consultant to the OECD, are the organization's attempt to resolve the differing privacy practices of OECD's 20 European member nations and its non-European members, such as the U.S. and Japan.

In their original form, presented last summer in Stockholm, the guidelines met strong resistance from U.S. delegates to the OECD [CW, Aug. 28], but the most recent draft follows, in "a fundamental and pervasive way," the suggestions made in a September U.S. submission to the OECD drafting group, according to William Fishman, an official with the National Telecommunications and Information Administration.

The U.S. paper itself incorporated "many of the basic principles that the Privacy Protection Study Commission noted in its report," according to Fishman, who helped draft the paper. Closely following U.S. suggestions, the latest Seiple draft offers the following "guidelines relating to the transborder movement of personal data." Countries, should:

- Take all necessary steps to ensure continuous and secure transborder movement of personal data and the observance of freedom of innocent transit of such data.
- Refrain from preventing or restricting transborder movements of personal data between countries unless such movements are contrary to laws on domestic processing of personal data [or] would considerably weaken the protection of data required by the country where the data originated.
- Refrain from developing policies and practices exceeding those required for the reasonable protection of personal data and inconsistent with the objective of promoting free transborder data movemets.

Although the current draft guidelines "reflect the approach the U.S. would take to guidelines," Fishman pointed out that the draft "went through an elaborate process of revision at the December meeting."

At that meeting, held Dec. 4-8 in Paris, the OECD delegates, including those from the U.S., suggested specific changes in the draft language. The changes are now being written by the OECD secretariat, according to Crawford, preparatory to the next meeting of the drafting group, scheduled for March. The group hopes to complete its work by July.

Crawford added that "because it is pretty strongly a U.S. version," it was thought there might be "some adverse reaction" to the latest draft. However, "we were quite pleased by the way in which the guidelines were accepted," he said.

The document's acceptance is made all the more encouraging to the U.S., Crawford said, because of the increasing recognition by OECD members of the importance of the organization's efforts to develop a nonbinding agreement on transborder data flow and personal privacy protection.

At the December meeting, he explained, there were delegates from several countries who are not members of the drafting group, which is made up of representatives of only seven OECD member countries. The Japanese, in particular, have shown greater interest in the group's activities, he said.

"There are a number of countries who are now taking an active role in the work. Whereas several of them had had only one or possibly two participants in earlier meetings, now they are sending three or four." In addition, "the background of participants is broadened beyond the data protection authorities in the countries to include ministers of foreign affairs, justice departments, and so on," making for a "wider range of participation," he said.

Crawford stated, "There is a very serious effort to arrive at these guidelines, and clearly the governments are taking it seriously. This stems in part from the difficulties the Council of Europe has had in its drafting exercise."

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Aetna Ads Emphasizing Privacy Protection

By Marguerite Zientara
CW Staff

HARTFORD, Conn. — Aetna Life & Casualty, the nation's fifth largest insurance company, has initiated a policy of allowing its 4-1/2 million policyholders to examine and, if necessary, correct information about themselves in company files. Much of this data is computerized.

In effect since Aug. 1, the program is based on the conclusions reached by the Privacy Protection Study Commission created by the federal Privacy Act of 1974, according to Nick Ellsberg, manager of corporate DP for Aetna.

Aetna has announced in its advertisements (one of which is reproduced here in part), "We'll ask you for the information we need, and no more. We'll tell you what data we're after, how we intend to get it and from whom. If we turn you down, we'll tell you *why*. (And we *won't* turn you down just because someone else has.)"

The advertisement says Aetna will disclose to the customer all information the company has about him — except medical information, which would go to the person's doctor — and that Aetna will "reinvestigate — and respond" if the insured discovers an error.

Aetna defines "respond" as follows: "If we are wrong, we'll correct the error by informing our source and anyone else you request who received the misinformation from us in the past two years.

"If we conclude our information is correct, we'll tell you so. If you ask, we'll even put your disagreement in the record. We'll also distribute that statement of disagreement in the same way as we would correct an error," the ad explains.

Aetna's president, William O. Bailey, served on the Privacy Commission, the purpose of which was to explore the need for controls and restraints on local governments' and businesses' use of personal information, much of which is presently computerized.

In 1977 the commission recommended new legislation requiring the insurance industry to take the action Aetna has voluntarily taken, but such legislation has not yet been enacted.

In Forefront

Although other insurance companies have indicated they are "looking at" similar policies for themselves, Aetna is in the forefront of insurance company privacy protection action. Industry observers note, moreover, that many competitors have strongly resisted the commission's privacy recommendations.

One reason for such resistance is undoubtedly the cost involved. While there is no charge to a policyholder for inquiries into company files, the program is "expensive" for Aetna, Ellsberg said.

Aetna has not yet determined the program's exact cost but has declared that it will not be passed on to customers in any way, according to Ellsberg.

The only possible charge incurred would be if an insured were to request multiple copies of his records, in which case Aetna would charge the cost of copying those records.

Response to the program so far has been "very minimal," Ellsberg said. For example, out of 4,000 rejection letters sent to life insurance applicants, Aetna has received 150 requests to have the applicant's medical information sent to the individual's physician.

Those figures encompass the period from May 1 to Oct. 1, Ellsberg explained, because state regulations necessitated Aetna's starting the program in the life insurance area in May.

To apprise policyholders of the company's position on privacy, Aetna sends out a brochure entitled "Your Privacy Is Our Concern." That booklet explains "what kind of information we have and where we get it."

The brochure lists the types of organizations to which disclosures of personal information may be made and promises, "Except as described above, we will not disclose information about you to other persons or organizations without your authorization."

Before an applicant is accepted as an insured, life insurance companies attempt to obtain accurate health histories; the applicant's financial status, to guard against overinsuring; and information about an applicant's personal habits that could possibly shorten his life, according to the 1977 report of the Privacy Protection Study Commission.

The companies make use of a number of information sources in these searches, such as investigative reporting agencies, also known as inspection bureaus, the report indicated.

But unfortunately, inspection bureaus have occasionally made a bad name for themselves with questionable information-gathering techniques, including misrepresenting themselves inorder to get medical records information from hospitals and other health institutions without authorization, the report noted.

Investigative agencies also routinely obtain information from neighbors, employers, associates, bankers, creditors and doctors or hospitals for medical records, the report said. In addition, public records tell insurance companies

(Continued on Page 16)

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If you think we have misinformation, just ask what we've got. We'll tell you the nature and substance of all underwriting information in your file. (Except medical information which we'll give your doctor.) If you say some part of it is wrong, we'll reinvestigate—and respond.[2]

And we'll go out of our way not to pass on information about you without permission.[3]

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For Small Computers, Peripherals

ISO to Consider Univac Standard in March

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — A Univac proposal for a standard interface for small computers and peripheral devices will be considered in March by a working group of the International Standards Organization (ISO), according to a member of the U.S. Standards committee that approved the proposal.

Delbert L. Shoemaker, chairman of the American National Standards Institute's (Ansi) X3T9 committee, said a task force of his committee recommended the Univac proposal over another standard developed internally by the task force last year. Univac introduced its proposed data bus interface at a meeting of the X3T9.2 task force last October in New Orleans.

The X3T9.2 group subsequently chose the Univac proposal at a mid-December meeting in San Diego. The decision was ratified by the parent X3T9 committee and forwarded as an "international working paper" to ISO, which had requested standards proposals in the "lower-level interface area," Shoemaker explained.

The Univac proposal employs a programmable interface unit, an LSI device that, according to the company, reduces the amount of external logic needed to connect systems components [CW, Dec. 18]. It will be considered at the March 14-16 meeting of ISO's TC97/SC13/WG3 working group along with other lower level interface proposals put forward by standards organizations in other countries, Shoemaker said.

"It will be a technical session at which all standards in this area will be considered by that committee," he noted. It is also expected that along with the Univac contribution, there will be at least one other standard proposed in the same "small computer to peripheral bus interface" area, he added.

Outcome Not Predictable

Shoemaker said it is impossible to predict what action, if any, the ISO working group will take on the two proposals. At most, the working group will recommend one of the proposals or a combination of the two to its parent committee, SC13, for further ISO consideration, he continued.

Two or three "technically qualified" members of the X3T9.2 group will participate in the meeting of WG3, which had requested, through SC13, proposals for lower level interfaces, he explained.

The charter of the X3T9.2 group is to develop U.S. proposals for I/O interface standards for small computers or minicomputers, he said. The ISO WG3 works on international standards development in the broader category of lower level I/O interfaces.

College Creates One Department For DP Study

SANTA BARBARA, Calif. — A computer science department has been created at the University of California's Santa Barbara (UCSB) campus under the chairmanship of Dr. John L. Bruno.

There had been two computer science groups at UCSB — in the departments of electrical engineering and mathematics. This arrangement became "inefficient and uneconomic," however, and hindered progress in computer science instruction and research, according to UCSB Chancellor Robert A. Huttenback.

The 135 students currently enrolled in an interdepartmental major leading to a B.A. or B.S. degree in computer science will now have the option of continuing their present programs through graduation or switching to the new B.S. program in the Department of Computer Science.

Though no advanced degrees in computer science have been offered, graduate-level programs are expected at UCSB in the next two to three years, Huttenback said.

The new department will be staffed mostly with current UCSB faculty members "who have been identified with computer science," the chancellor noted.

NCC Announces Steering Group

MONTVALE, N.J. — National Computer Conference Chairman Merlin G. Smith recently announced the NCC steering committee for the June 4-7 New York conference.

More than 120 technical and professional sessions will be under the direction of Dr. Richard E. Merwin, a research professor at George Washington University and consultant on real-time computer systems and special-purpose languages. Robert Spieker, director of data systems operations for AT&T in New Brunswick, N.J., will act as vice-chairman.

Anita Cochran, a technical staff member of Bell Telephone Laboratories, will act as assistant chairwoman.

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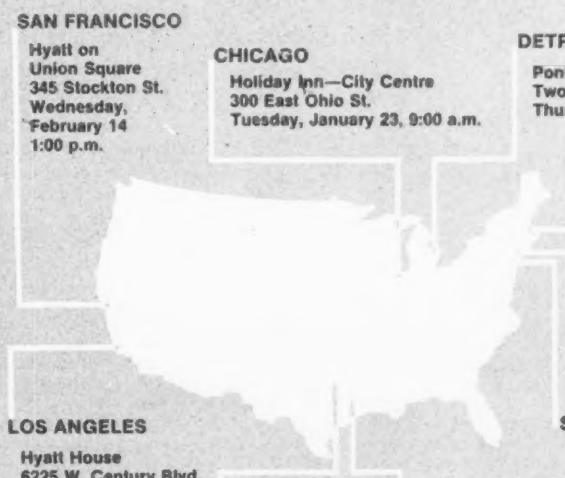

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Could Limit Corporate Growth

Telecommunications Personnel Shortage Seen

By Jay Woodruff
CW Staff

NEW YORK — A "severe shortage" of telecommunications personnel has limited corporate expansion, and the situation is not likely to change unless a recession increases the flow of persons into available jobs, according to Jay Jacobson of Personnel Resources International, Inc., a telecommunications industry placement agency here.

"It might even get worse," he noted. The shortage of hardware and software designers is particularly acute in the centers of the major cities of the Northeast, he said, where as many as a third of the available positions have remained unfilled for a year or more. Even in Sunbelt locations, from 10% to 15% of available jobs are unfilled, he asserted.

The placement specialist estimated "90% of those persons seeking employment get jobs because of the shortage."

Jacobson defined telecommunications personnel as those who design or work in any aspect of the telecommunications field. Only in the top positions are jobs filled quickly, he said, and the competition is fierce because "more people want to get the top jobs."

Corporate telecommunications expansion, education trends and lack of manpower supply are the reasons for so many open jobs, Jacobson said. "A company of any size now has four people in telecommunications where several years ago it might have had only one," he remarked.

At the same time, company increases in telecommunications personnel have been limited by a slowdown in the number of engineering graduates, which he said might have been partly the result of widespread layoffs, several years ago, of engineers in the aerospace industry.

Traditional sources, such as experienced workers from the telephone companies, have dried up too, he said. Systems engineering positions, sales jobs or positions where advanced equipment experience is required show shortages for applicants for jobs that pay up to an average of $22,000, Jacobson reported.

But since there is no flow of new people to fill lower level positions, the number of upper level jobs has not expanded, causing competition for the few available positions, he added.

Intense Competition

Demand is growing fastest for applicants familiar with data communications, advanced traffic and network planning techniques and state-of-the-art switching equipment, Jacobson explained.

He added that higher level openings in these positions (paying $30,000 or more) create intense competition similar to that for the jobs referred to above because not enough people are moving into the field to allow the people already there to move up.

There are dozens of unfilled jobs in New York and Chicago with which Jacobson is familiar, and there could be hundreds more, he noted. The number of jobs open for telecommunications personnel nationwide could be "well up into the thousands."

Personnel Resources recently completed its 10th Annual Telecommunications Salary Survey. Salary ranges for engineers, communications managers, consultants, sales and marketing personnel and real-time DP/systems personnel are listed.

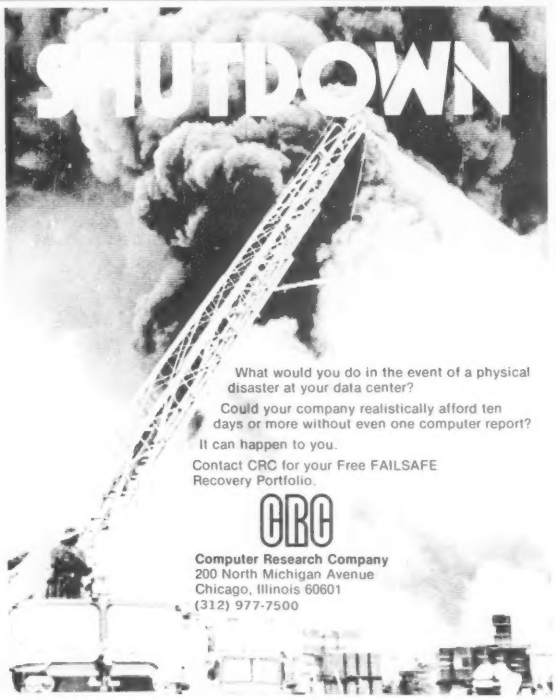
To illustrate the salary range available in the New York area, which Jacobson said has one of the most acute shortages and hence pays the highest salaries, the survey noted that DP operations managers there would earn from $23,100 to $26,200. Elsewhere in the U.S., on the average, the same position would pay $20,100 to $24,500.

Wanted: Experience

Jacobson said the demand for experienced personnel comes from nearly all segments of the telecommunications industry and all regions of the country. Many employers look for employees who have had experience with data communications systems.

Employees entering the telecommunications job market for the first time, either with an engineering degree or with military telecommunications experience, usually get offers, he noted.

The effect of this shortage is to force employers to be somewhat less selective in filling positions, he said. "Employees who several years ago would have had difficulty obtaining an appropriate position now are finding warm welcomes from prospective employers," Jacobson concluded.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(Continued from Page 14)

of financial or legal difficulties faced by the prospective customer.

Aetna makes use of "very few" investigative reporting agencies, Ellsberg said.

Data Disclosure

Once obtained, information about an applicant is routinely disclosed to other insurance companies as well as the Medical Information Bureau (MIB), Ellsberg said.

The MIB is an unincorporated, nonprofit trade association set up to facilitate the exchange of medical record information among about 700 U.S. and Canadian life insurers.

In addition, information routinely flows from insurance companies to agents, reinsurers, the insured's physician and inspection bureaus to facilitate the preparation of investigative reports, the privacy report said.

Because life insurance is often required in order to pursue a career or conduct a business, insurance companies may disclose information about customers to loan institutions and employers, although Aetna will do so only with the customer's permission, Ellsberg said.

State insurance department officials may also receive such information in response to inquries or complaints and in examinations of company underwriting practices.

Aetna will release such information only in statistical form, according to Ellsberg, unless it is in response to an insured's request for an investigation.

Insurance companies often disclose the same information to independent auditors employed by the insurance company to make investigations stemming from similar inquiries or complaints, the report noted, but Aetna will do so only with permission of the insured.

If information is subpoenaed by federal or state government or law enforcement agencies, insurance companies will comply and supply it. If the information is requested and not subpoenaed, Aetna will supply it only with permission, according to Ellsberg.

While Aetna presently stands alone at the frontier of insurance company privacy protection policy, insurance privacy legislation may well be implemented within the next few years.

Working on the issue is the National Association of Insurance Commissioner's task force on privacy laws, which is drawing up a model privacy law that insurance commissioners around the country could recommend to their state legislatures.

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Committee Makes Recommendations

Great Britain Edging Toward Privacy Legislation

By G. Russell Pipe
Special to CW

LONDON — Great Britain is edging toward comprehensive privacy legislation. Recommendations of the Data Protection Committee (DPC) released by the government in December call for the establishment of a Data Protection Authority (DPA), the registration of personal data systems maintained by private organizations and government agencies and the preparation of some 50 codes of practice for particular applications.

The proposal, even if accepted by the Callaghan government, must be turned into legislation and approved by a highly volatile Parliament.

The report conforms with European trends for an independent regulatory body with jurisdiction over government and commercial records, a registry of automated and semiautomated personal files and enforcement machinery. By embracing the code of practice technique, the British are following established tradition and giving a nod to the American view, which supports sectored solutions to developing fair information practices.

Need for Legislation

The 12-member DPC, chaired by Sir Norman Lindop, was appointed in February 1976, shortly after a white paper, "Computers and Privacy," was presented to Parliament. It concluded there is a need to adopt privacy legislation in the UK.

The DPC report is a treatise covering privacy concepts, the UK's computerized personal information practices, regulatory options, transborder data flows and implications for major recordkeeping sectors.

The DPC proposed that legislation be enacted to set up the DPA, which would be an independent agency. "The DPA should be as independent of government as of users in the private sector. It should have the maximum independence consistent with public accountability. It should therefore not come under the control of a minister," the committee recommended.

A governing board of eight to 12 members would be responsible for policy and major decisions; it would provide panels to hear internal reviews of cases. The members would be "widely representative of the community at large." In addition, an executive staff of about 40 officials, bound by an absolute obligation of secrecy, would be appointed.

Specific Definitions

The act would apply to "the automatic handling in the UK of personal data by any user."

"Personal data is defined as any data which relates or can be related to an identified or identifiable individual.

"Handling refers to the collection, recording, assembly, storage, selection, combination, alteration, deletion, destruction, display, transfer, communication and publication of data. "Automatic handling" means the handling of data by any device capable of carrying out stored instructions.

"User stands for any person who, alone or with others, carries on or causes to be carried on any automatic handling of personal data in any part of the UK, wholly or in part for his own interest and determines what data is handled.

DP bureaus are included in matters over which they have control.

Codes of Practice

The DPA would prepare codes of practice which define detailed rules to be applied in any system "for collecting, processing or storing personal information where any part of that system is automatic." Entirely manual systems would be excluded.

Preparation of the codes would involve wide consultation with interested parties before implementation. The codes would take the form of subordinate legislation, approved by Parliament. Each would be tailored to particular types of applications.

The report explained that the codes would set out rules for maximum data protection, according to the following principles:

- Data subjects should know what personal data about them is being handled, why it is needed, for what it will be used and for how long.
- Data should be used only to the extent and for the purposes made known when it is obtained or as subsequently authorized.
- Data should be accurate, complete, relevant, up-to-date and no more extensive than necessary for the purpose for which it is collected.
- Data subjects should be able to verify compliance with these principles.
- Costs to users and interference with their operations should be kept to the minimum.

The recommendations call for a broad but not universal scheme of registration of personal data applications with the DPA. Under this scheme, all central and local governments would be required to file all personal record systems.

Industrial and private sectors would be required to register their applications according to the terms specified by the codes of practices under which they are regulated.

The DPA would compile and maintain a master register open to the public. It would show details of each application, although certain parts of particular registers might be withheld from public inspection either at the request of a user or where disclosure would clearly hinder the detection or prevention of crime.

Persons seeking reports from the register or copies of DPA findings at public hearings would be provided such materials for an appropriate fee.

Initial DPA "pump-priming" financing would be provided by the government. Afterward, the estimated 1 million pound budget would be raised through registration fees paid by those bound by codes or practices.

Criminal sanctions would be imposed on organizations failing to register a "registrable activity." A breach of a code of practices would be a more serious offense.

In addition to penalties, the report urged that courts order a convicted user to take steps to comply with his appropriate code of practice. Deliberate violations should be subject to imprisonment, it stated.

Police files would be subject to the act only where they are matters of public record, such as criminal records. National security materials would be subject to ministerial exemption. Nevertheless, a DPA privacy consultant with security clearance would serve as liaison with intelligence agencies.

Patients would not have an unrestricted right to access medical files. Education records would be open to students and/or parents. Social work records would be available to data subjects to check their accuracy. Employment records would be generally available to employees.

Transborder Data Issues

The report responds to an array of transborder data flow concerns, including the data haven issue, which have been raised in the six European countries with such legislation and in debates in the Council of Europe and the Organization for Economic Cooperation and Development (OECD).

The DPC urged that the act not be restricted to data subjects who are nationals or residents — or physically present — in the UK. Rather, "the statute should protect everyone, whoever and wherever he or she may be, from abuses of data handling activities to the extent that any part of those activities take place within the legal jurisdiction of the UK."

It recommends further that:

- Foreign entities operating in the UK in any activity which is included in the definition of "handling" should become subject to the DPA's jurisdiction.
- The DPA should be explicitly em-

(Continued on Page 19)

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OUR TERMINALS HAVE IT ALL TOGETHER

Masters' for Software Engineers Seen Needed

By Brad Schultz
CW Staff

WASHINGTON, D.C. — Universities should develop graduate-level programs in software engineering, according to participants at a recent conference here.

Such programs would meet an accelerating need for software engineering professionals caused by the proliferation of increasingly complex computer systems in society, the speakers agreed. Software is the basic medium by which society perceives and uses its DP facilities, they noted.

Primarily addressed to theoretical research, most universities' computer science departments do not train for software engineering expertise and frequently award Ph.Ds to individuals who have little firsthand knowledge of the programming process, according to Leon G. Stucki and Lawrence J. Peters of Boeing Computer Services, Inc.

Moreover, academic instruction in software development tends to focus on resolving well-defined problems, while industry must cope with a host of problems that are not well-defined, Stucki and Peters maintained.

The Boeing DPers presented a software engineering graduate curriculum proposed by the Institute of Electrical and Electronics Engineers (IEEE) committee on Software Engineering. The course load covers computer architecture, data base design, interactive systems, system performance, measurement and evaluation, software technical writing, programming methodology, software maintenance and the psychology of programming.

Texas Christian University has been considering adoption of a similar software engineering masters' degree program, according to its author, A. A. Hoffman of the University's computer science department.

A third proposal to the conference attendees was offered by the IEEE Computer Society. As discussed by Richard E. Fairley of Colorado State University, this program seemed more diversified than the other two, with studies in digital logic, discrete mathematics, formal languages and automata, telecommunications, distributed processing and machine architecture as well as software topics.

A student entering the latter masters' degree program ideally would have completed an undergraduate core sequence roughly equivalent to most bachelors' degree programs in computer science, plus "two to three years work experience," Fairley said.

Writing Seminar Planned

NEWFIELD, N.J. — Computer professionals who must communicate highly technical information to a nontechnical audience can reportedly improve their writing skills at a two-day seminar to be held this year in Philadelphia, San Francisco, Houston, Chicago and Atlanta.

Each seminar is limited to 15 participants and early registration, which costs $420, is suggested by its sponsor, The Communications Skill Center.

James Wilson, creator of the instructional materials used in the seminar, said the 16-hour course should give the veteran computer professional "the basic skills he will need to write a lucid textbook on his area of expertise."

Further information is available from Computer Executive, Box 74, Newfield, N.J. 08344.

Britain Moving To Privacy Law

(Continued from Page 18)

powered to modify appropriate parts of a code of practices when compliance with both UK and foreign data protection regulations would impose unreasonable obligations.

- The DPA should be explicitly empowered to include in any code of practice such regulation, restriction or prohibition of the transborder transmission of personal data it considers necessary or expedient to ensure compliance with the code.
- The UK should play a positive role in current negotiations for an international data protection convention.

DP Reactions

Initial reactions to the report raised concerns over increased costs to DP operations and processing services and heightened uncertainty for the DP community. The UK trade press echoed these themes.

Computer Talk predicted, "DP managers could well have to dig deep into their budgets to finance Britain's privacy legislation." DPC Chairman Lindop added to this uneasiness by commenting recently that "The costs depend on the dispersion of data and the relationship between the data subject and the user."

According to an analysis by *Computing Europe*, waiting even a few more months will mean that those ordering, designing and installing systems will be faced with "needless expenditure to conform with the report's requirements."

"Shunting responsibility" was the complaint of *Computer Weekly* because the DPC did not immediately place explicit requirements on users saying the codes of practices would be prepared later.

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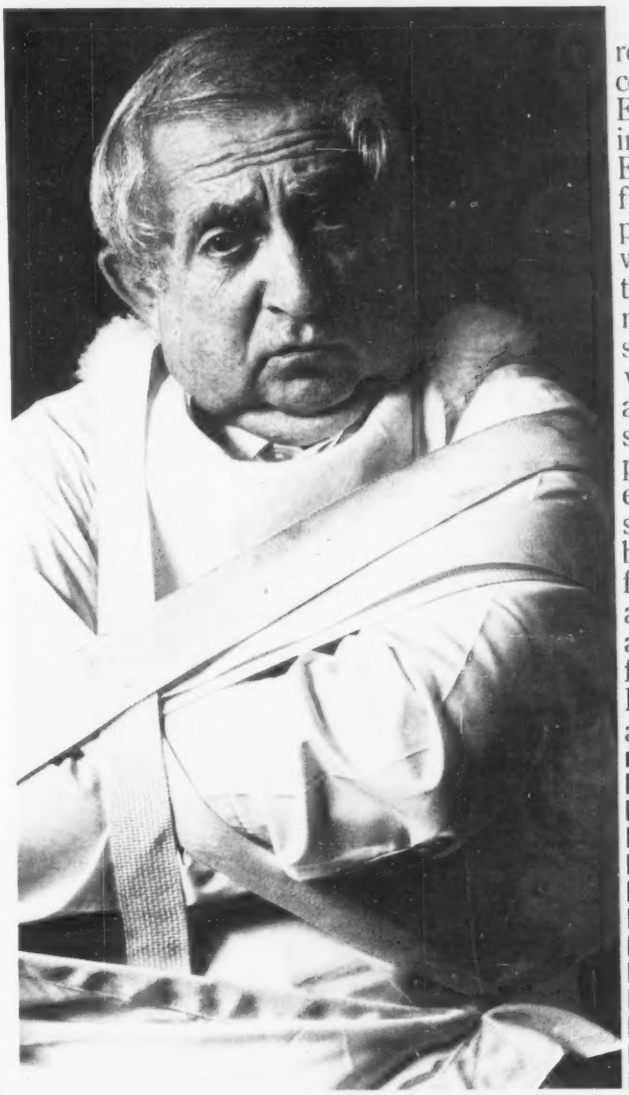

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PRODUCTS FOR PERFORMANCE

IBMer Says Military CPU Offered Innovations

By Connie Winkler
CW Staff

NEW YORK — IBM benefited from the Sage computer contract with the Air Force in the mid-1950s, but both sides in the U.S. vs. IBM antitrust trial here disagreed on what and how much those benefits were.

"From Sage we learned the importance of digital data transmission to the data processing field," Robert P. Crago, who was project manager of Sage at its peak, recently testified. "We learned a great deal about the characteristics of the telephone network to be used in this way and how to interface with modems.

"We learned a great deal that stood us in good stead for the proceeding type of application represented by Sabre." Sabre was the American Airlines reservations system based on Sage.

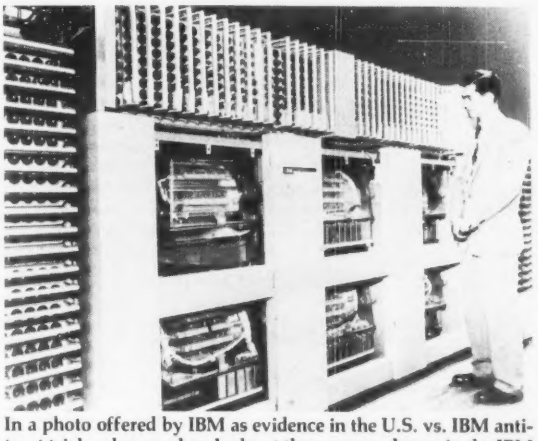
Crago, now manager of advanced programs, command and space systems for IBM's Federal Systems Division (FSD), was called by IBM to testify on the importance of the Sage contract to IBM and the risk the company took in filling it, according to IBM counsel Ronald S. Rolfe.

Crago made a long list of Sage's economic and technological benefits to IBM: it was the first geographically dispersed real-time computer system; it represented the first large-scale use of phone lines to transmit digital data; it was the first big use of computer-to-computer communications; it used the first time-sharing duplexed computers; and it offered improved cathode ray tubes, core memory and printed circuit boards.

The government objected, however, that these innovations had already been developed in Project Whirlwind, a computer system built for the Navy by MIT. Crago admitted most did come from MIT, but said MIT did not have to be responsible for the full-time defense of the nation in the Cold War period.

"Whirlwind was only a prototype, and an industrial company was needed to take on the large task of reducing the prototype to a reliable, repeatable, practical design and to manufacture, install and maintain several dozens of the systems — systems of unprecedented complexity which employed heretofore unproved technologies," Crago pointed out.

Government lawyer Jan Luymes introduced a memo by Crago about a meeting with top IBM executive T.V. Learson. The memo said "Mr. Learson pointed out how little of a new nature we had achieved from Sage and thought we should learn from this experience in creating new capabilities under present contracts."



In a photo offered by IBM as evidence in the U.S. vs. IBM antitrust trial, a dapper chap looks at the memory drums in the IBM Sage computer. These memory drums are the forerunners of today's disks.

Learson, who later became IBM chairman, wanted IBM to get into areas such as communications, nose cones and radar instead of becoming more proficient in computers, as happened with Sage, Crago said.

If IBM benefited so much from Sage, why in the mid-1960s was it so far behind its competitors in time-sharing, communications controllers and digital data trasmission and CRTs? Luymes asked in a series of hypothetical questions. Crago answered that there had been much technological leap-frogging after Sage.

Benefits for IBM to which the government agreed included the Kingston, N.Y., plant started in 1954 for Sage. Costs for Kingston which were not usual in an IBM plant were charged to the Air Force, Crago said. Kingston was also depreciated at the faster rate allowed for military contract plants.

IBM risked little on Sage because of the favorable contract payment terms, the government suggested. Crago said IBM made a 10% to 15% profit on the Sage contracts; other witnesses have testified there is about a 30% profit on commercial computers.

This, observers believe, indicates IBM divides the market into government/scientific — or special-purpose machines — and general-purpose systems. This point has been a contention of the government's case in the trial.

The Air Force awarded the first contract to IBM in 1952 for an air defense computer system for the continental U.S. Sage is an acronym for "Semiautomatic Ground Environment"; its function was to accept, process and display large quantities of digital data from radars relating to the detection, identification and tracking of aircraft.

This data was used to direct and control air defense weapons, Crago said.

Eventually 26 of the computer systems — each had 60,000 vacuum tubes and covered two acres of space — were located around the U.S. Seven are still in operation.

Sage was unique in its time because it used teleprocessing to connect the radar via phone lines to the computers and the location of aircraft was displayed on CRTs.

Because of the need for high reliability and availability of such a defense system, duplex computers were at each site. The entire Sage network cost the Air Force at least $2 billion.

Crago testified that he saw less and less distinction between commercially available computers and those specially made for the military. About 50% of computers now used for military-type applications are commercial machines.

IBM is in the process of bidding for a Marine Corps contract with an IBM Series/1 minicomputer, but with a different box at the same price as the Series/1. IBM is arguing in the trial that there are no differences between general-purpose and special-purpose computer systems.

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Nutrition Analysis Helps Plan Proper Diets

By Jay Woodruff
CW Staff

FREMONT, Calif. — Even though computerized diet analysis may not help nutrition students at Ohlone College increase their willpower, it does make it easier for them to know exactly what they should eat.

In a program started last spring, the college's year-old Nutrition Education Center uses a Hewlett-Packard Co. Series 2000 Access System to make nutritional analyses of food intake and to suggest specific foods that should be added or subtracted to balance a given diet. The computer cuts the time needed for the traditional method of analysis from as many as six or seven hours to a few minutes.

"To make a nutritional analysis without a computer involved looking up the nutritional value of each food eaten over a period of time — usually a week," Betty Clamp, the center's director said. Vitamins, calories, minerals and cholesterol are a few of the components that had to be listed to get a complete diet picture.

The total of each food component was compared against a list of daily minimum requirements set by the Food and Nutrition Board of the National Academy of Sciences.

In order to recommend a diet that would balance the totals to agree with the daily requirements, it was necessary to look up foods that could be added or substituted to the diet to give the desired total.

"The procedure was so tedious that by the time the analysis was finished, the student could hardly care less about the results," Clamp said.

With the computer, all the steps beyond listing the foods to be studied are completed and printed out in less than three minutes.

Two Programs

While the nutrition center was being completed a year ago, the school was installing the HP 2000 to handle applications not run on the school's IBM 360/30 and IBM 360/40, which are tied together. Clamp inquired about programs that would allow the center to computerize diet analysis and got two programs — Dayreq, written in Basic for the HP 2000, and Diet, written in Fortran for the IBM system.

The Dayreq program is suitable for most student applications in the classroom, whereas the Diet program is used for such things as the analysis of trace minerals, and the generation of graphics displays that can be used to compare a person's food intake against the recommended intake based on one's physical activity, weight and other factors.

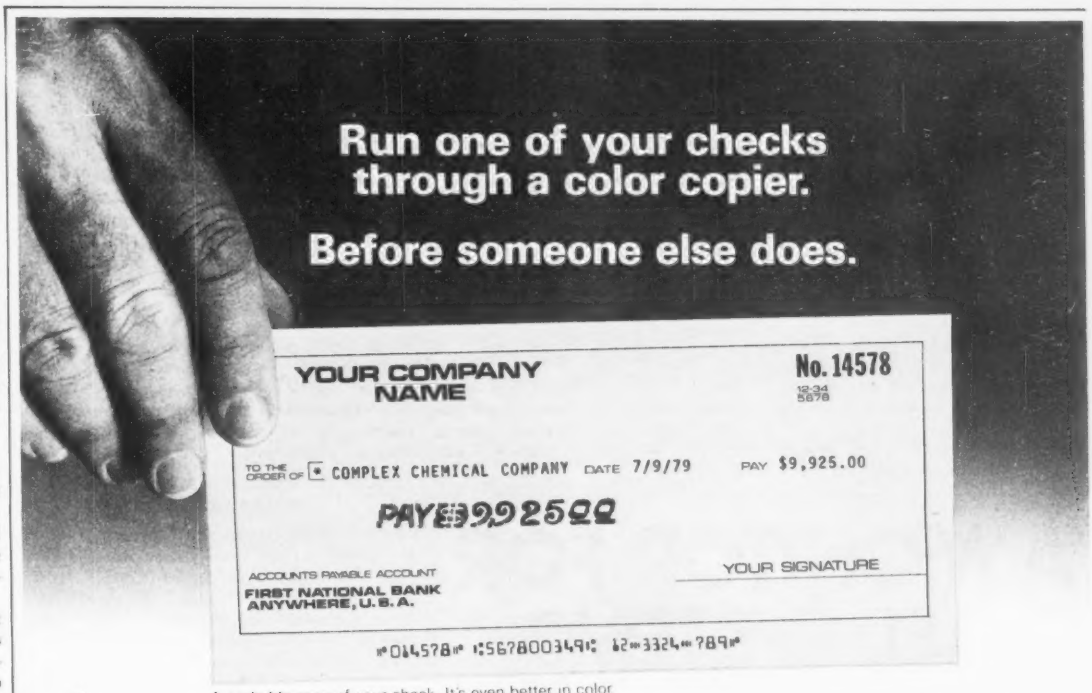
Students are often surprised at the results of their diet analyses, Clamp said. One student had her diet analyzed by the computer and found she was taking an anticonvulsant drug that interfered with the production of folic acid, part of the vitamin B complex. The computer suggested she take a vitamin supplement and/or eat certain foods to counteract the drug's effect.

Other Users

Students are not the only persons taking advantage of the school's diet analysis program. Local hospitals use Ohlone's system to work out diets for special patients, Clamp said. She added that the center will have to expand the scope of its analysis program to cover the subject more completely.

For example the computer has information on the number of calories in fat, but not on those in carbohydrates or proteins.

Information is not included on phosphorous, and such information is needed in the planning of diets for dialysis patients. "There are a few things like this I want to have changed," the nutrition director said.



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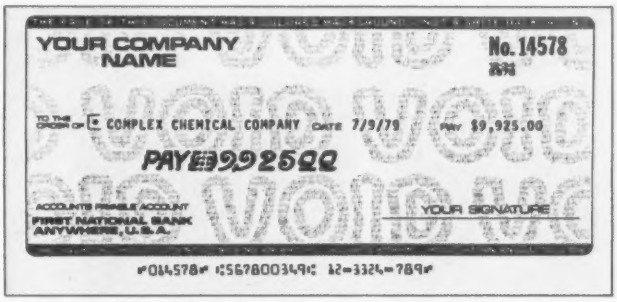

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Venus Data Could Explode 'Big Bang' Theory

By Tim Scannell
CW Staff

MOUNTAIN VIEW, Calif. — Aided by a battery of earth-bound computers, the Pioneer Venus 1 spacecraft — followed a few days later by five Venus 2 probes — recently dipped into the soupy atmosphere of the sun's second planet and sent back a long-awaited, $220 million weather report.

The instrument-crammed vehicles recorded atmospheric temperatures that exceed 900°F, heavy clouds made up of various heat-trapping gases and a constant fiery shower of sulfuric acid.

Figures sent back by the probes also revealed an abnormally high concentration of argon 36, an inert and primordial gas, which contradicted basic theories and beliefs concerning the "Big Bang" formation of the solar system. The data indicates the nine planets surrounding the sun may not have been formed from a single mass of material and Venus itself may be a part of an entirely different solar system, a spokesman here at the Ames Research Center said.

More than 114 scientists have been involved in both the Venus 1 and Venus 2 missions from its drawing board stages nearly six years ago.

Topographic Portrait

The Venus 1 orbiter is currently circling Venus, 36 million miles away; it was designed to cruise at roughly 100 to 41,000 miles above the scorched surface of the planet. When the craft is at the low point of its orbit, its sensitive instruments scan Venus with a radar mapper which will theoretically give an accurate topographic portrait of the surface.

At the craft's highest revolutionary point, infrared and ultraviolet cameras take pictures of the sulfuric cloud tops, according to Charles Hall, mission chief here at Ames, the National Aeronautics and Space Administration's (Nasa) project center.

The Venus 2 spacecraft cluster, consisting of a rocket "bus" and four probe "passengers" — Sounder, North, Day and Night — were designed to measure temperatures, chemistry, density and wind velocity on the Venusian surface.

The bus began taking measurements at the very top of the atmosphere, transmitted digitized data back to earth and then burned up during its 26,400 mile per hour descent. However, the other four cylinder-like probes were fitted to decelerate to about 30 mph as they fell toward the molten ground while transmitting data back to earth stations.

Two of the probes survived the impact on the planet's surface long enough to send back vital meteorological information. In fact, the Day probe lasted a full 67 minutes and relayed back considerably more data than was initially expected.

Two Mainframes

All of the data transmitted to earth from the two-fisted mission was processed through three Xerox Corp. Sigma V computers located at the Ames Research facility. Two of the mainframes were telemetrically linked to the probes on-line while the third maintained off-line production and experiment data records, Hall said.

The faint signals transmitted from the instruments circling and on earth's sister planet were picked up by large tracking antennas at Goldstone, Calif., Madrid, Spain, and Canberra, Australia. Dish-like antennas on Guam and in Santiago, Chile, also received some of the signals, which rapidly changed frequencies because of the speed and deceleration rate of the probes.

The signals were transmitted in a digital bit stream format, encoded at each of the tracking stations and relayed to the Ames Research Center via a high-speed data line. At the center, the Sigma computers processed the decoded data — a series of ones and zeros — and mathematically searched for the beginning of the bit string.

When a particular format was identified, "the computers isolated certain groups of bits within the entire string which corresponded to a certain measurement," Hall stated. "It's that identification of the grouping and then the application of calibration constants to the measurement that helps convert the signals to [understandable] engineering units."

Data logs were then printed out by the computer and cataloged by the scientists and engineers on the Pioneer team.

Abundance of Argon

Although it will take months to fully understand the significance of the mountain of meteorological data sent back by the probes, scientists have already focused their research on why there is such an abundance of argon-36 in the Venusian atmosphere.

Instruments aboard the Pioneer 2 — including a sensitive neutral mass spectrometer — measured levels of argon-36 several hundred times higher than those on earth, even though it was formerly believed that both planets shared a similar cosmic birth and history, according to Texas physicist John Hoffman.

"There is a lot of meteoritic material in different parts of the solar system with different histories," Hoffman explained. "Some of it is very rich in argon-36 and some of it has almost none."

For some reason, "we seem to have a lot more of this primordial gas on Venus," the scientist continued. "This means we may have to rethink the early history of the inner satellites of the sun" such as Mercury, Venus, Earth and Mars.

One Minor Problem

The entire Pioneer Venus mission was considered a success except for a minor command problem with the orbiter spacecraft which prevented some radar-mapping experiments from taking place and halted a series of ultraviolet photos that would have captured a portion of the planet's surface.

The Venus I is guided by a set of daily commands contained on between 600 and 700 punched cards, mission chief Hall explained. The cards are routinely fed into two Digital Equipment Corp. PDP-11/20 minicomputers that act as an uplink to the orbiting instrument package.

Someone apparently keypunched the wrong command on one of those cards. As a result, the spacecraft momentarily lost sight of the planet below, Hall said.

"It couldn't find the planet because it was looking 90° too soon. It should not have happened, but I guess it just fell through the cracks," the mission director stated. "We do have systems set up to prevent that, but the people over here have been working 18 hours a day, and they were just tired."

The missing experiments and photographs can, however, be repeated when Venus rotates into position under the solar-powered orbiter. "It's a problem we don't intend to repeat," Hall remarked.

Soviet Mission

Meanwhile, the Soviet Union landed two instrument packages on Venus to make temperature, pressure and density measurements as well as monitor the radioactivity levels from the uranium, potassium and thorium in the Venusian rock.

The Venera 11 and 12 arrived at the planet about Christmas Day. The latter spacecraft dropped a bas relief of Russian Communist leader Vladimir Lenin on Venus to commemorate the Soviet accomplishment.

American space scientists have agreed to meet with Soviet researchers this spring to compare notes and data distilled from both missions and correlate pertinent information, according to Dr. Noel Hinners, assistant Nasa administrator. "They have agreed to an exchange of scientific results prior to publication," Hinners said.

Compcon Set Next Month

SAN FRANCISCO — Compcon 79, the annual technical meeting of the Computer Society of the Institute of Electrical and Electronic Engineers, will feature three preconference tutorials, six keynote speakers and 25 technical sessions here next month.

Scheduled for Feb. 26 to March 1, the conference's theme is "Exploding Technology/Responsible Growth," according to Dr. Dean Brown, its general chairman.

Preconference tutorials will be held on Feb. 26 on electronbeam lithography, computer graphics and software management.

Keynote speakers will include MIT Prof. Robert C. Seamans, former Secretary of the Air Force, and Stanford University Prof. William Miller, known for his role in establishing the university's linear accelerator facility.

Information about registration can be obtained from Terry Contreras, Room L-307, Lawrence Livermore Laboratory, P.O. Box 808, Livermore, Calif. 94550.

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Bookworms May Give Way To Tubeworms in Future

McLEAN, Va. — Will the word "bookish" metamorphose into "tubeish" by the next century in the face of library-applied computer technology? One might think so after reading The Mitre Corp.'s latest library report, "Microcomputers in Library Automation," published in December.

While the 50-page booklet concentrates mostly on available technology usable by libraries, it winds up its discussion with a look into the future of libraries, predicting such possibilities as holographic filings, computerized browsing and home printouts of desired books that would eliminate the idea of book circulation as we know it.

The illustrated booklet is divided into six chapters, contains three appendices and provides the librarian and the technician with "insights into each other's domain," according to the summary.

Relevant Explanations

One chapter explains basic computer terminology and its relevance to the library field. Discussed are such things as the difference between a microprocessor and a microcomputer, potential uses for personal micros in library applications, future memory technology and the joys of distributed DP.

Another chapter approaches the technology from the librarian's viewpoint, with such topics as circulation control, cataloging, acquisitions, serials control, reference, library administration and audiovisual services. Discussed under each heading are the particular requirements, automation available to fill those needs and, in some cases, future roles for the microcomputer in such applications.

The chapter entitled "Considerations Before Selecting a System" deals with cost, performance, price/performance evaluation, operational environment, electrical power, system costs, market size and negotiating with vendors.

Use of Tables

There are 10 tables throughout the booklet on such things as "Overlapping of Computer Catergories," "Application of Microprocessors by Word Length" and "Custom-Designed Acquisitions Systems."

Each chapter ends with a list of references for further information on its subject.

The three appendices contain a list of abbreviations used in the booklet, a glossary of computer terms and a list of vendors, divided into the categories of automated circulation, automated cataloging, automated acquisitions, automated serials, information retrieval and small business computers.

Six blank pages are included at the end of the book for note-taking by the reader.

The booklet costs $3, which includes postage and handling costs. The Metrek Division of The Mitre Corp., is located at 1820 Dolley Madison Blvd., McLean, Va. 22102.

OCR Users Set Up Grant

HACKENSACK, N.J. — The Optical Character Recognition (OCR) Users Association has established a $1,000 Annual Education Grant which "supports our interest and desire to help promote the future of the optical character recognition industry," according to James Wilson, association president.

The association's executive director, Frank Cooper, said methods and criteria of grant recipient selection are under discussion.

A decision on the selection process should be reached by a July 15-18 meeting of the group in Boston, according to Cooper.

The association is headquratered at 10 Banta Place, Hackensack, N.J. 07601.

Wok Do You Think?

By Jay Woodruff
CW Staff

SEATTLE — When the *Seattle Times* editorial system experienced a humidifier heating coil failure during unseasonably cold, dry weather, operators treated the computer to humidity from a wok, a device used in cooking Chinese food.

The wok was brought into the computer room to provide some moisture. It was in service for a week, until the heating coil was replaced. Water was poured in its bowl-shaped bottom and left to boil.

Paul Doyle, management services manager at the *Times*, admitted that the wok "didn't do much, as you might expect," but personnel tried it to reduce the chance that static electricity would cause the equipment to malfunction.

The Model 3400 editorial system is from Hendrix Electronics Corp. It includes three Digital Equipment Corp. PDP-8/E CPUs and four PDP-11/35 controllers and is used to process in-house copy and copy sent from remote locations.

Doyle was amused by the coverage the paper received for using the wok. The Associated Press ran a short article which he said was the result of an article written by a *Seattle Times* humorist.

The story received national coverage, even though Doyle made it clear that the system did not develop any static problems.

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The 'Weak Link': Funny Bits of DP History

By John W. Butler
Special to CW

People are quick to point out a computer's errors, but they should realize that a computer — like any other system — is only as good as its poorest component. After 11 years in field service, I find that all too often the "weak link" is a human.

For instance, I remember the Boston bank that tabulated credit card charges during the night shift. This job was time-consuming, so it was relegated to an operator who ran interpreters in the next room.

The procedure was simple enough: the operator would feed tray after tray of cards into the tab and, after several hours, take a final total to be compared with the subtotals supplied by the branches. While the job was running, he would go to the other room to run the interpreters.

Periodically, he would return to refill the hopper in the tabulator and empty the stacker.

It was a simple operation until the final total began to differ from the subtotals, as if an entire card had been missed. Dick, the operator, was called; he checked and he tested . . . but to no avail. Baffled, he called in Tom, a technical specialist, but Tom couldn't locate the problem either.

So they stayed around to watch the entire tab operation, hoping they might observe a failure.

With coffee in hand and dynamic timer in place, Tom had the operator run the job. After the job had run flawlessly for two hours, the janitor entered the room to sweep up. He swept the dirt into a neat pile in the center of the floor and took a card out of the hopper to use as a dustpan.

Tom nearly choked on his coffee as he gasped, "Hey! What do you think you're doing?"

The janitor calmly replied, "Well, this card is no good; it's already full of holes, so I'm using it to pick up the dirt."

Tie in the Gears

Sometimes, the service rep is called in on a mission of mercy only to have to fight back laughter. For instance, Len was called to a DP school in Lynn, Mass., because a student caught his tie in the gears of an interpreter while removing a jam. Since it wasn't a rush call, Len finished his work and, after lunch, headed for Lynn.

Upon entering the school, he was surprised to find the student still attached to the machine and asked, "Do you mean you've been like this for two hours? Why didn't you cut the tie?"

From a bending position, the student replied with a blush, "I didn't think of it."

Winter Indoors

It goes without saying that unit record machines are more prone to human interference than today's computers. This is mainly because many manual operations are now automated functions of the computer. However, let's not make the mistake of believing that we have eliminated human errors.

One cold February day, I received an urgent call from a retail distributor in Nashua, N.H. The firm's CPU had started up in a halt, and its people were unable to reload the operating system.

I called at once to see if the office was unusually cold that morning, which would have accounted for a core failure. The office manager assured me it was no colder than usual.

You can imagine my feelings when I entered the office after a 90-minute drive and found everyone in winter coats. Space heaters were scattered throughout the office. I was informed that the heat had gone out during the night, and the temperature was 40 degrees when the workers arrived.

After we restored the system's "body" temperature, it worked as advertised.

Many times, we receive urgent calls from impatient users who have made blatant operational errors. The story about forgetting to plug in the machine is too common an occurrence to include here; however, the disk pack stories may be better suited.

Mike, a conscientious DP manager, called me with a serious problem one afternoon. He had to run the payroll, and the disk drive failed to ready . . . even after 30 minutes.

When I arrived on the scene, I discovered he had forgotten to insert the disk pack.

Meanwhile, at a small manufacturing firm, Frank, the controller, was surprised to get a head crash on his main data pack. He didn't think a six-foot drop to a concrete floor would hurt the pack, so he had tried to use it.

A large Boston insurance company had many small systems scattered throughout its computer operations. Most systems had two attached disk drives. I went in on a call for read errors only to find both drives down.

Harry smoked quite heavily, and it turned out that he had changed the disk pack while smoking. Apparently, an ash — which I found — fell into the shroud area, causing eight of 10 heads to crash.

When Harry encountered read errors on drive zero, he moved the pack to drive one, which promptly crashed six heads. At that, he determined the data pack was bad so he changed jobs and mounted a new data pack on drive one; it crashed. Smoking, it would appear, is even bad for a computer's health.

Slow to Act

Some people think a maintenance contract magically absolves them from all guilt. Sue was operating a terminal and dropped her chocolate frappe into the keyboard. After the machine was fixed, she sheepishly asked, "I suppose this can be billed?"

Mary, the terminal operator at a small retail firm, had her problems with a keyboard, too. She spilled a glass of water in it. This wasn't too bad except she didn't know what to do, so she left it alone for several hours. By the time her boss arrived to turn it off and call for service, it was completely shorted out.

Even some managers lose their heads when faced with an unusual problem. Edward Fitzgerald frantically called my office one day. "My machine caught fire; have John call me," he said.

I was paged on the road and called him back in a half hour only to hear that thick, black smoke was pouring out of the CPU. "Well, I hope you turned it off right away," I told him.

"No, I was waiting to hear from you before I did any-

(Continued on Page 26)

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Foibles, Follies in DP History Remembered

(Continued from Page 24)
thing," he replied.

Some people resent computers. Consider the case of the maid and the modem. A large West Coast hotel had purchased a computer. Part of the system was devoted to the housekeeping department. The maids had portable modems so that as rooms were cleaned, this information could be entered into the system. A guest found one modem floating face down in a bathtub full of water. Fortunately, the service rep was able to save the victim.

I certainly don't want to forget the outside contractors. One electrician was supposed to change the outlets at a Boston clothing manufacturer's computer room.

The company had a large, older model system that ran on 220V lines. It purchased a new system that required 110V. After running the two systems in parallel for several months, it arranged to have the old system shipped out and the new one moved into the computer room. On Thursday the old system went out as planned, and on Saturday the electrician arrived as scheduled.

Monday morning the computer staff arrived to find all the outlets installed so they carefully placed the equipment, plugged it in and turned on the system.

Lights began to pop and then blacken; smoke rose from the CPU. The system was shut down at once.

The electrician hadn't had a meter on Saturday, so he had connected the plugs into the existing 220V lines and left. It was only a minor error (about $20,000 worth).

Erasable Core

Of course, computer humor isn't just a comedy of errors. Some computer humor is intentional. Once I worked on a terminal that utilized internal core memory for screen refresh. But it had a bug; several characters on the screen could not be erased. The contacts on the memory board built up an oxide coating.

To remove the coating, I used a pencil eraser on the contacts and rubbed off the oxide. Harry, a programmer, asked what I was doing.

"Why, erasing core," I replied with a straight face.

"Aw, who are you trying to kid?" he asked. At that, I turned on the terminal and, to Harry's surprise, the strange characters were gone. Amazed, he exclaimed, "I didn't know you could erase core with a pencil eraser!"

I couldn't bear to tell him what really had happened. I wonder how many people he told about erasable core.

Then there was Sandy. Sandy loved to operate the computer at a retail business. Perhaps I should say that she loved to play the games package supplied with the system. Unfortunately, she would fail to do her work when she became too engrossed in the games.

To eliminate this problem, Don, the office manager, who was a fairly good programmer, changed the name of the games program and wrote a new program to take its place.

The next day, I was doing parts and maintenance on the system. When I finished, I gave the system to Sandy to use while I completed my paperwork. Of course, the first thing she did was to run the games.

Suddenly, the bell on the terminal started to ring as *"Are you sure you have time to play games?"* flashed continually across the screen.

Sandy tried to silence the tattletale terminal by hitting all the keys, but to no avail. Finally, the office manager walked slowly through the crowd that had gathered at the terminal. I don't think she ever tried to run the games again.

John W. Butler is a service representative with Sorbus, Inc.

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Count Plagued by DP Problems

Loser in Va. Senate Race Backs Off on Recount

By Tim Scannell
CW Staff

RICHMOND, Va. — Citing the high costs of election recount procedures, Democrat Andrew P. Miller has abandoned his quest for a second tally of the votes in last November's computer-troubled U.S. Senate race here and formally conceded victory to Republican John W. Warner.

Miller reportedly raised close to $35,000 to cover recount expenses, but decided to throw in his political towel when a three-judge state court ruled retabulation costs would probably exceed $70,000.

The court also ordered Miller to post bond before beginning the recount to guarantee that at least $80,000 would be paid to election board officers and secretaries should he remain the loser after the retabulation. Under Virginia election laws, Miller would have had to absorb the cost of the recount if he did not defeat Warner in the second tally.

"Following the long campaign . . . it has proved impossible to raise the additional level of funding which the court's order could require," the Senate hopeful stated. "I sincerely congratulate Mr. Warner on his victory and wish him well throughout his six-year term as Virginia's junior senator."

System Problems

Miller originally disagreed with the outcome of the election when the News Election Service's (NES) computer — used to unofficially process the Virginia returns — declared Warner the winner of the close race by less than one-third of 1%, or by 5,190 votes out of the entire 1.2 million votes cast.

The NES computer, located in New York, was reportedly plagued by numerous delays and inaccuracies on election night, fouling up voting returns and coverage across the nation [CW, Nov. 13].

At one point, the beleaguered computer system, which intermittently failed during various statewide vote counts, listed more voting precincts than Virginia actually has.

However, an official canvass conducted about three weeks after the election by the state Board of Elections found Warner had indeed won the U.S. Senate race by 4,721 votes. Miller announced his plans to file for a recount five days later.

Although Miller could petition the U.S. Senate to officially examine the election results for any discrepancies, lawyers representing the ex-candidate acknowledged he has decided not to pursue the matter any further.

If Miller had chosen to continue with plans for a retabulation of the November voting results, it would have been the first statewide recount in Virginia election history.

Feng New Head Of IEEE Society

SILVER SPRING, Md. — Tse-yun Feng, a professor of electrical and computer engineering at Wayne State University, has assumed the post of president of the IEEE Computer Society, replacing Merlin G. Smith of IBM.

A senior member of the Institute of Electrical and Electronics Engineers, Feng has published more than 50 technical papers and reports and holds a patent on associative memory.

E.A. Parrish Jr. of the University of Virginia and Michael C. Mulder of the Bonneville Power Administration were elected first and second vice-presidents, respectively.

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Word Processing Students Helping Air Force

By Jay Woodruff
CW Staff

BILLERICA, Mass. — High school business students learning modern office procedures — and word processing — are giving the Air Force a hand with its a paperwork at the same time.

Project Impact — Impact stands for "Improved Administrative Capability Test" — began when the Electronics Systems Division at nearby Hanscom Air Force Base started to test word processing machines, both to determine the best machines for each office application and to observe what kind and how much automation would do the best job of improving word flow. The word processors are connected to a time-sharing service in New York, according to Dave Derose, a systems engineer at Hanscom.

Because the base had more to type into the word processors than base personnel could handle, officials decided to see if Shawsheen Technical School here could help.

The school agreed that both the base and the high school would benefit if the students at the school could take over some of the base's excess paperwork. It would give the students an opportunity to work on actual business documents instead of textbook drills.

Documents from the base are sent to the school over telephone lines via Xerox 410 telecopiers. Students type the documents, including financial data, contracts, specifications, management reports and anything else that cannot be handled by the base's own staff, into a Xerox 800 terminal located in the school's business department.

Finished documents are loaded onto a telecopier and sent to Bowne Time-Sharing Service in New York. Hanscom communicates directly with the service to gain access to information sent from the school.

Testing Fifteen Machines

The word processing system was implemented with assistance from Booz-Allen Applied Research Co., a Washington, D.C., consulting firm. The firm recommended 15 machines from a variety of manufacturers, and the machines were placed in seven base offices.

The base is monitoring each machine's maintenance requirements and interviewing operators to see how the processors are used and how well they perform.

"We like Xerox Corp., CPT Corp. and Lanier Corp. equipment so far," Derose said, "but we still have to try machines from Lexitron Corp., Micom Systems Corp. and Wang Laboratories, Inc."

CPU Planned

The Air Force base plans to install its own CPU, according to Derose, so all of the various terminals can be made interactive.

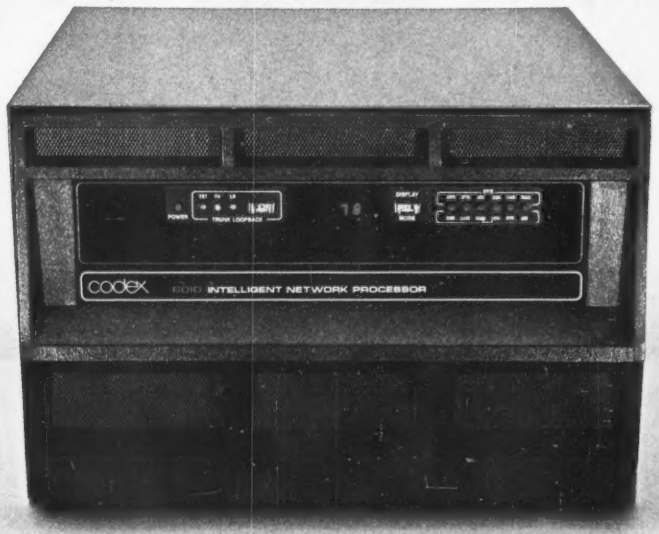
"The central computer will take the output of a Xerox machine, for example, translate its code to a base code and send it to a Videc machine in Videc code," the engineer explained. At present, word processors are independently connected to the time-sharing system.

Among the machines Hanscom is considering for the job is a Digital Equipment Corp. system, Derose said, but no decision has been made on how large a system the base will require.

Replacements Planned

In January of 1979, the Air Force will replace the high school's Model 800s with Model 850s, according to Brenda Miccio, an instructor at Shawsheen. The 850 model is easier to use, she said, because students can edit what they type before it is printed.

Admission to Shawsheen is restricted, and prospective students must take an exam to determine who will be admitted.



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More Than Technology Involved

Wider Horizons Urged for DPers in Simulation

By Jay Woodruff
CW Staff

MIAMI — DPers should widen their horizons from technology to "a broader understanding of the ecosystems involved" in the technological revolution, participants in the 1978 Winter Simulation Conference were told here recently.

Dr. Philip A. Tenkoff, vice-president of engineering and communications for the Data Service Group at Computer Sciences Corp., said DPers should "pause long enough to consider factors beyond the technical challenge of the particular simulation in which [they] are interested."

The conference's keynote speaker, Tenkoff pointed out that cost, user acceptance, benefit to society and basic human rights will have a greater impact on the growth of technology than technology itself.

According to Tenkoff, the evolution of our economy from an industrial society to a postindustrial society is largely the result of the technological revolution. "No longer are we a society dominated by industrial production; we are a society dominated by information," he said.

Tenkoff recalled an observation that, in the U.S., the first third of the century was dominated by U.S. Steel and the second by General Motors. "It is now clear," he said, "that the 'ownership' of the final third of the 20th Century has narrowed down to a contest between IBM and AT&T."

Recent Advances

He went on to draw a picture of recent advances in technology and how they are and might be used. Microprocessors which cost $100 and have the computing ability of a $1 million computer of 1950, for example, have "radically changed computer size, cost and capability," the speaker said.

Sophisticated multiplexing techniques, fiber optics and satellites have allowed communication technology to advance as quickly as computer technology, Tenkoff continued, but there are problems that must be addressed if development is to continue at today's pace.

"Of all the computer and communications technologies, none has gained faster acceptance, been more influential or affected a greater variety of user-oriented services than remote data processing," he said. The problem is liability, when someone or a group is hurt by the technology.

The growth of remote data processing may also be slowed by the issues of privacy and security, Tenkoff said. "Those charged with the responsibility for installations, whether they be computer files or manual files which store and process such data, must not lose sight of this basic right," he declared.

In light of the fact that information is becoming "an increasingly valuable commodity," national governments are beginning to examine their right to ownership of information crossing their borders. There are indications, Tenkoff suggested, that the cost of tariffs for a communications service "can affect the economics of telecommunications network design far more than improvement in a few percentage points in network topological optimization."

He gave as an example the cost difference of maintaining a single voice-grade channel from Boston to Baltimore, which costs $400 a month, and a similar channel from Boston to Brussels, which costs "about $10,000 more a month." Such fees, he said, "will progressively exert increased influence upon the remote computing industry."

Electronic funds transfer (EFT) is desirable, Tenkoff said, because it is cheaper and more convenient for users than conventional, paper-based banking systems. It is a problem, however, because under today's legal guidelines, a consumer does not have the legal safeguards on his money under EFT that he has under traditional methods.

The biggest problem, he said, is that EFT "offers opportunities for fraud and embezzlement." It is likely that EFT's value, its overall cost and convenience will eventually appeal to the customer, especially when legal issues are settled, he added.

NCC Session Set On Simulation

NEW YORK — The Society for Computer Simulation (SCS) and Dr. Brian Unger of the University of Calgary's Department of Computer Science are sponsoring a session titled "Languages for Computer System Simulation" at the 1979 National Computer Conference (NCC).

Five papers will be presented at the session, which will be chaired by Unger. Among them are "Parametric Instabilities of Computer System Prediction" by L. Dowdy and A. Agrawala of the University of Maryland, "The Simulation Language Siml/1" by Amdahl Corp.'s M. MacDougall and "Meta-Languages for Operating Systems" by Phil Enslow Jr., of Georgia Technical Institute.

This year's NCC will be held here June 4-7.

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Program

Conference Chairman: Herb Grosch, Former President of the ACM

Monday 19 March
1 **Market factors and technological change** Ulric Weil, Morgan Stanley
New IBM products, and IBM's marketing strategy, will be determined by what is wanted by users and what is technically and economically feasible. This session examines the changing application requirements of existing and prospective users, evaluates future trends in the costs and performance of current and forthcoming technologies, and diagnoses the economic health of IBM and its competitors in the near future.
2 **System 370 and beyond** Lorenzo Bosio, Itel
The 303X series is an end-of-life 'kicker' for the 370 architecture, its low purchase to lease cost ratio indicates that IBM wants customers to buy rather than lease – and that's always a sign of impending obsolescence. What will the new E and H series look like, and when will they be announced? This session investigates IBM's short and medium term plans for new mainframe announcements, and assesses their impact on users and competitors.
3 **Future IBM peripheral systems** Peter Bates, Memorex
Peripheral systems account for an increasing proportion of hardware costs. What new storage and I/O devices will IBM introduce, and how will they be packaged in relation to processors hardware and software? This session examines new and established technologies, assesses their future commercial significance, and predicts how they will be incorporated in IBM's new range of peripheral systems.
4 **IBM's global strategy** Phil Dorn, Dorn Consultants
Data Processing Division (DPD) is the heart of IBM, and DPD is intent on rejuvenating the mainframe market. But Office Products and General Systems Divisions (OPD and GSD), which will shortly merge, are into new markets, with new and rich prospects (and new problems, too). This session shows how IBM's centre of gravity is slowly shifting, and explores the consequences both for IBM and for the rest of the DP community.

Tuesday 20 March
5 **System software – IBM's plans** Dick Bayles, National CSS
Two distinct trends are apparent in IBM's software strategy: the first is the extension of unbundling into system software, and the second is the migration of system functions from software into firmware or even hardware. What effect will these trends have on future IBM architectures, and how will they affect suppliers of IBM-compatible software and hardware?
6 **IBM's database plans** Stephen Robinson, Consultant
Committed to IMS, but with a strong internal faction in favor of the relational approach, it nevertheless seems probable that IBM is about to adopt a database architecture based on the ANSI and CODASYL proposals. Such an architecture could well be implemented using a new 'back-end' database machine. What will IBM's strategy actually be?
7 **IBM and the plug-compatible suppliers** Bill Easterbrook, Kidder Peabody & Co.
Ever since unbundling, IBM has been plagued by fierce competition in narrow areas of its product range. The plug-compatible suppliers of peripherals and mainframes benefit from the standard interfaces developed by IBM. IBM can damage the plug-compatibles by changing those interfaces, but only at a significant cost to itself. IBM also has a powerful battery of economic weapons at its disposal. What are IBM's options, and how will the plug-compatibles respond?
8 **IBM and the US Government** Herb Grosch, Consultant
The US Government is probably the only organization in the world that has the power to materially affect IBM's plans – as a customer, and as the instrument of regulation and control. Its 'legal muscle,' combined with its massive purchasing power, make it a potentially formidable protagonist in the computing arena. What effect will Government policies and actions have on IBM in the next five years? In terms of standardization, anti-trust, and communications regulations, IBM's future may hinge on the decisions of politicians.

Wednesday 21 March
9 **IBM's plans – networking and data communications** Ronald Sander, Library of Congress
IBM was later than most other manufacturers in recognizing the close connection between computing and communications, but there is no doubt that networking and data communications are now central to IBM's future plans. How will current IBM networking concepts (in particular SNA) be extended or modified in the future, and what new developments can be expected? How will IBM incorporate satellite communications and other new communications technologies into its future product line?
10 **IBM in Europe** Pierre Audoin, PAC
Like most giant American-owned multinationals, IBM's relations with European national governments and the European Economic Community are often strained, and IBM's attempts to trespass on the territory of the telecommunications authorities are likely to cause further confrontations. What are the political issues involved, and what will be the technical and commercial consequences for IBM's European users and competitors?
11 **IBM – the user's view** Edward Farrell, Amax
New IBM products are only one of the existing IBM user's worries. Perhaps more important, over the next five years, are such considerations as support, pricing policy, maintenance, and IBM's general business practices. In this session these and other factors of significance to the IBM user are analysed, and possibly changes in the relationship between IBM and its users are foreseen.
12 **Forum**
An open discussion session at which speakers answer questions from the floor and elaborate on points raised during the Conference, while delegates contribute their own experience and expertise to the discussion.

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Editorial

A Dangerous Precedent

Computer crime is a relatively new field that is often a mystery to lawmakers drafting legislation in this area and to prosecutors trying to obtain convictions.

The ability of standing law to grapple with abuses of digital technology was recently tested in Edmonton, Alberta, where a Canadian federal court justice found two former University of Alberta students guilty of the "theft of telecommunications services" because they accessed the university's main computer system without authorization [CW, Jan. 8].

Under Section 287 of the Canadian federal criminal code, telecommunications theft entails abuse of a telecommunications facility or service. The section does not mention computing equipment; in fact, it was reportedly written to protect telephone companies from secret telephone modifications aimed at avoiding toll call charges.

The application of a seemingly unrelated law to prosecute persons who allegedly used a computer system without permission sets a dangerous precedent.

Prosecutions should only be undertaken if the current law clearly applies to the matter at hand. In the event a criminal code obviously fails to prohibit computer abuse, a new law may be needed; but in no case should statutes clearly addressed to a different sort of technology be applied to computing.

The danger here is to civil liberties. The courts have no business redefining a law's applicability so that activity of a nature not considered by the law's authors is rendered punishable by imprisonment.

The University of Alberta's two ex-students could be sentenced to a maximum of 10 years' imprisonment for reportedly "playing" on the university computer system. According to informed sources, no evidence was introduced during the trial that the defendants were motivated by monetary profit in this matter; nor could they have sought to alter grade transcripts — a frequent target of university computer abusers — since those records were kept on a separate facility.

Should unauthorized recreation on a system be considered a felony that carries such harsh sanctions?

According to Canadian law experts, no section of that nation's federal criminal code is specifically addressed to computer abuse other than privacy violations. Crown prosecutors based their argument for conviction on the assumption that a computer system is a type of telecommunications equipment *only because* such equipment is covered by sanctions against illegitimate use.

Debate on the Ribicoff Computer Crime Bill, which is expected to be reintroduced after the 96th Congress convenes this week, should consider the implications of the Alberta decision.

Federal law in the U.S., just as in Canada, appears largely ill-suited to prosecution of many types of computer abuse other than privacy violations. A noteworthy exception is the recently passed Electronic Funds Transfer Act, which defines and sets penalties for fraudulent or malicious use of computerized banking networks.

But a facility breach, like the one that occurred in Alberta, is difficult to prosecute under current U.S. law.

Much of the problem can be attributed to a lack of technical expertise among attorneys and judges. Most cannot be expected to fully appreciate the complexities of computer crime, which features such intangibles as misuse of computer time and software.

U.S. legislators owe their constituents a criminal code pertinent to computer abuse that includes clear definitions of such terms. This would help offset deficiencies of technical expertise and generally improve the nation's ability to deter such abuse.

Data Past

Five Years Ago
Jan. 16, 1974

NEW YORK — Computer operators struck Blue Cross of Greater New York with job security as the primary issue.The Blue Cross plan to shift from an emphasis on Honeywell Inc., equipment to IBM equipment was one worry for the operators, who felt that the IBM equipment would require fewer operators and their jobs would be at stake.

Eight Years Ago
Jan. 20, 1971

NEOSHO, Mo. — Jerry Lee Jackson, recognized and arrested as a "parole violator" by local police, was set free because of incomplete computer data. He was freed by a U.S. marshal who had been informed by the FBI's National Crime Information Center that Jackson's arrest warrant had been "rescinded." At the time, he didn't know that Jackson had escaped from a "halfway house" while awaiting completion of parole papers.

— — —

FORT WAYNE, Ind. — The computer operators and about half of the programmers in the DP center of International Harvester Corp.'s Motor Truck Division here struck the company because of wage disputes. It was reported that the auto industry's pattern on wages was the problem.

Letters to the Editor

EFT Concern Misdirected

It has occurred to me that recent concern over electronic funds transfer (EFT) security, while valid, has been misdirected, as pointed up in "Bankers Seen Unaware of EFT's Vulnerability" [CW, Dec. 18] and an editorial, "Bankers Beware," in the same issue.

Of all alleged perpetrations of electronic fraud in recent months, including the Bausch and Lomb case, Security Pacific and at least one other case that went unreported, none was directly attributable to electronic data security. They could just as well have taken place on the older, manually controlled networks.

Indeed, similar situations have arisen in the past without the help of any computer at all.

In view of the not inconsiderable problems most authorized users have in gaining access to today's major EFT networks (notably Fedwire and Bankwire), the prospect of gaining fraudulent, electronic control of such networks is, while not impossible, an arduous and expensive one.

In fact, the proper use of computers in EFT can be of great benefit in at least two ways. First, it can augment standard physical security. Second, because most wires tend to be repetitive and/or predictable in nature, computer use can isolate unusual cases.

Even in the case of automated teller machines, where electronic data security is considerably more vulnerable, the major problems lie in preventing unauthorized control of personal identification cards and codes and in preserving the physical integrity of the machine itself.

While I certainly don't want to play down the critical nature of electronic data security, I do not believe that the ultimate answer lies in data encryption, more complex pass codes or daily modified protocols. The biggest problem we still face is physical security.

It's time we began to think of the computer as a tool for coordinating security — not merely as an added complication to an old security problem.

Jack Straub
Tempe, Ariz.

'A Veritable Boomerang'

The letter "If in Doubt, Power Off" [CW, Dec. 25/Jan. 1] is a veritable boomerang and it is the DPers who'd better duck!

According to my assessment of the incident described, the subjects of Petroskey's intemperate denigrations (e.g., the security guard, the night nursing supervisor) acted responsibly when faced with a perceived crisis in the wee hours *in the absence of any DP information to the contrary.*

Where were the standing orders to the guardians of the night that would have alerted them to normal, unattended system operation? As a last resort, a conspicuous notice near the CPU could have averted the incident.

This particular account is not simply another instance of DPer insensitivity to interorganizational communications but, with the arrogant tone of its telling, is also in violation of common courtesy.

As another matter, since nobody missed the system after it came down, perhaps a DP system midnight curfew — in the interest of energy conservation — is in order?

This joke is on the DPers!

Peter Kushkowski
Haddam, Conn.

Another Tool for 'Big Brother'

If Big Brother wants to, he can watch you and me and everyone else, and he can do it a lot more easily with that nine-digit Zip Code.

Richard E. Marks
Blue Bell, Pa.

The Taylor Report

Confusion on Withheld Tax Can Be Solved

By Alan Taylor
Special to CW

Many DP operations throughout the country were confused when they ran the first 1979 weekly payrolls. But this is only part of the chaos that will occur if the Internal Revenue Service (IRS) continues to push the philosophy behind the newly calculated Table 8 for estimating federal income tax.

More problems await the DP departments when they run their biweekly and monthly payrolls. But the worst disorder can be expected next year when form W-2 is distributed.

It will show taxpayers that not enough income tax has been withheld, and suddenly, in one lump sum, they will have to pay 28% of their total taxes.(All this can be anticipated only if the IRS continues to use Table 8.)

Those DP departments that realize the problem at least can inform their people that the tax being withheld is being incorrectly calculated.

Tax Guidelines

The problem arose when the IRS calculated the numbers to put into the universal table, which is used by at least 99% of the computer payroll systems in the U.S. In Table 8, "Daily or Miscellaneous Payroll Period," the IRS provides figures based on the person's average daily earnings (See box).

This is standard. The IRS works out the minimum daily amount a person must earn to owe taxes (which it gives as $5.50 for a single person) and then the various ranges, $5.50 through $12.70, $12.70 through $26.20 and so forth. These divisions are based on carefully calculated amounts and reflect the latest finance bill provisions.

Within each division, a specific tax and a percentage of excess are computed. These figures are used as parameters in the computerized payroll systems and have been for years.

The 1979 tables — when they were published in November 1978 — looked no different than earlier ones. There was no warning that the computations had been performed in a different manner this year, so they were routinely put into operation.

Only after the pay slips for the weekly runs were distributed on Jan. 4 and 5 did a problem come to light. Not enough tax had been withheld.

What had happened? The IRS, without changing the instructions for using the tables, had switched from counting calendar days to counting business days.

Patch Job

In fact, the Jan. 3 payroll calculations could be corrected simply by dividing by the number of *business* days, calculating the tax per day and then remultiplying (remembering to multiply by the number of *business* days for the period).

The solution that was found around the country, with the quiet semiapproval of the IRS, could be summarized as "For seven, read five." It seemed like a nice, easy solution because it meant changing the instructions but leaving the figures alone.

Regretfully, I must say that it won't work. If the IRS continues to push its philosophy, we are in for chaos that the simplistic "For seven, read five" patch can't handle. To show this, let's look at some problems that are bound to come into play.

TAYLOR TEMP VALUE	IRS TABLE 8 VALUE
Single Persons	
3.93	5.50
9.07	12.70
18.71	26.20
28.00	39.20
39.00	54.60
47.29	66.20
61.79	86.50
Married Persons	
6.57	9.20
18.14	25.40
29.93	41.90
41.21	57.70
52.71	73.80
64.86	90.80
79.43	111.20

This table compares Taylor's suggested figures with the IRS figures for federal income tax withholding.

The problem with "For seven, read five" is that it only works when the result

(Continued on Page 37)

The Human Connection

Reader Interest Peaks On DP Training of Execs

By Jack Stone
Special to CW

A computer-driven Pandora's box. I lifted the lid on this monster when I offered the illustrious *Computerworld* readership a free copy of my paper on top executive training [Oct. 2, 9].

As of this writing, I have had 478 requests and the figure is still climbing. All have been answered, so let me know if you didn't receive your copy which includes my personal cover letter.

It took quite a while to get those personal letters generated, because as I was doing them, I somehow backed into a simultaneous upgrade of my microsystem processor, disk drives, operating system and word processing application program, a wrenching experience surely shared by at least one or two others in the business.

Although many people writing in had some comments about the challenge of training executives, only a few had experiences they were willing to talk about:

• Oklahoma: "In my work, I have had a moderate amount of exposure with introducing our executives to the operations of data terminals. I have experienced a number of very interesting and amusing situations which I would be happy to share with you if you are interested . . ."

• Minnesota: "I think this 'hands-on' approach is effective for all employees, not just the executives . . . These executives may have been so [bored with] lectures that *any* unique training approach was favorable to them . . ."

• California: "The procedure you describe sounds amazingly like a series we are developing here as part of our customer education program . . . I will be delighted to share the results of our program with you as implementation progresses."

• Alberta, Canada: "We read with interest your recent article . . . Often we are overimpressed with what is to be presented and consequently neglect who the recipient is and what the best vehicle is by which to communicate effectively to them."

• Iowa: "I've had some experience in training people in industry and I would have to agree with the general rules you listed in your article.

"The necessity for giving executives hands-on experience is absolutely essential. The more cycles of knowledge-application-success one can structure in a one-hour or two-hour presentation, the better, to ensure great interest and satisfaction on the part of the students."

• California: "Your article was

(Continued on Page 37)

White Hat, Black Hat

Packard Torn on Issue Of U.S.-Japan Trade

By Herbert R. J. Grosch
Special to CW

A million years ago, Dave Packard began his electronics career — in the General Electric Co. test program, the famous pre-World War II ingestion routine for young engineering graduates. "Work where Steinmetz worked" and all that. It was great — I met lots of the product in Evendale and Phoenix in the '50s.

Well, Packard went on to help found Hewlett-Packard Co., serve as Number Two in the Pentagon and become a senior statesman of the electronics world.

I heard him do his bit recently under rather unusual circumstances. He was on a panel with Wilfred Corrigan, president of Fairchild Semiconductor, Roger Bender, president of Massachusetts-based NEC Microcomputer (part of Nippon Electric Co., of course), and Pete McCloskey, the freshly reelected congressman for Silicon Gulch. The subject was "Encroachment of Japanese Firms on Today's Semiconductor and Tomorrow's Electronics and Computer Industries."

I'd heard about the shindig in Palo Alto a few days before when, at a U.S.-Japan seminar, three really fancy Tokyo executives, Charles Sporck of National Semiconductor Corp. and Bob Noyce — one of my personal heroes — had tangled in the same arena.

The seminar had been fairly formal, although forceful, but the show I attended was entirely different — an evening entertainment for 400 to 500 vociferous purchasing agents, their guests and adversaries, at the annual banquet of their clan. Packard in particular spoke off the cuff, rather than from his usual carefully prepared and specially typed speech notebook. And everybody answered questions. It was — well, revealing!

Bosses' Night

Unlike the U.S.-Japan function, the purchasing agents' gathering had almost no attendees from the press. It was sort of Bosses' Night — lots of company big shots were there, including the president of Amdahl Corp. and a whole gaggle of HPers. I write about it because it *was* different; although the gripes were the same, they were in a coarser and franker mode.

My attention focused on Packard, although Bender did a far better job. For one thing, I got a deeper view of him than I had on the many earlier occasions I'd heard him. For another, Packard is still a force in Washington, even in the Carter environment. And as the evening wore on, he

(Continued on Page 36)

Attention to Specifics Urged

Basic Tips Suggested for Picking FM Vendor

By Richard S. Mathews
Special to CW

When a business concern decides to consider facilities management (FM), it is important that at least two vendors vie for the contract. Competitive bidding will not only reduce quoted prices, but will also help identify potential problems that might be overlooked when dealing with just one prospective vendor.

Requests for proposals should be in writing, outlining what the business wants to do, the kinds of systems in which it is interested and the performance it expects.

In reviewing the submitted proposals, the user should note whether bidders address the specific issues covered in the proposal requests. Vendors' proposals should also reflect their flexibility on legal questions, their requirements on the funding of software development costs and their response to customers' performance criteria.

Reader Commentary

According to Richard C. Ducharme, vice-president and comptroller for the Merchants Savings Bank of Manchester, N.H., and a panelist at a seminar I sponsored and moderated for banks during the past year [CW, Jan. 8], his bank considered it undesirable to deal with an FM firm that has limited resources. This would be true especially if the bank would have to fund software development, he said.

In efforts to select a vendor, Ducharme observed, the bank made a subjective evaluation of each bidder's staff. Visits were made to users of each vendor's services to review the software and observe the vendor-customer relationships.

When First Security National Bank of Lexington, Ky., was considering the renewal of its FM contract, the evaluation actually began when the proposals were first reviewed. The bank's object, according to Julian E. Beard, First Security's first vice-president, was to get the four proposals down to a bottom-line figure that could be examined and weighed.

This was very difficult because each vendor had a different proposal. For example, some vendors covered data entry in their proposals, while others left this function to the bank.

Vendor Negotiations

Beard told the seminar attendees that the negotiating process can be dynamic. Vendors, he said, are experts in negotiating contracts because they do it often. However, banks usually negotiate contracts only once every four or five years, especially if they continue to use the FM concept.

He offered the audience several pointers for negotiating the terms of an agreement:

- Keep negotiating teams small: Have a small group from the bank and a small group from the vendor (both groups, hopefully, having the authority to agree on points).
- The involvement of at least one other vendor helps to enhance the bank's negotiating position.
- Don't negotiate yourself into a box. In other words, don't accept a seemingly attractive FM agreement for a given period without considering the implications. For instance, find out if the bank has to deal with the same vendor for a second five-year period or longer under potentially unsatisfactory terms.
- Be fair to the vendor to get his cooperation.
- The bank should strive to remain in charge by sticking to essentials and being willing to give in on smaller points.
- Let the vendors know where they stand throughout the negotiation process. This creates an openness that encourages vendors to revise their proposals and to remain responsive and cost-competitive.

Selection Criteria

In discussing how his bank made a selection from the bidding vendors, Beard said that emphasis was given to 14 or 15 criteria including price, contract flexibility, the impressions made by the vendors' people, overall opinions of the vendors' software, financial strength, track record and commitment to banking.

Each factor received a numeric value; the most important was assigned 15 and the least important, 1.

Each vendor was ranked from 1 to 4 for each factor. For instance, the vendor who bid the highest price got a 1 because that was the worst case. The lowest bidder was assigned a 4.

A total number was arrived at for each vendor, and the one with the highest score was considered the

(Continued on Page 34)

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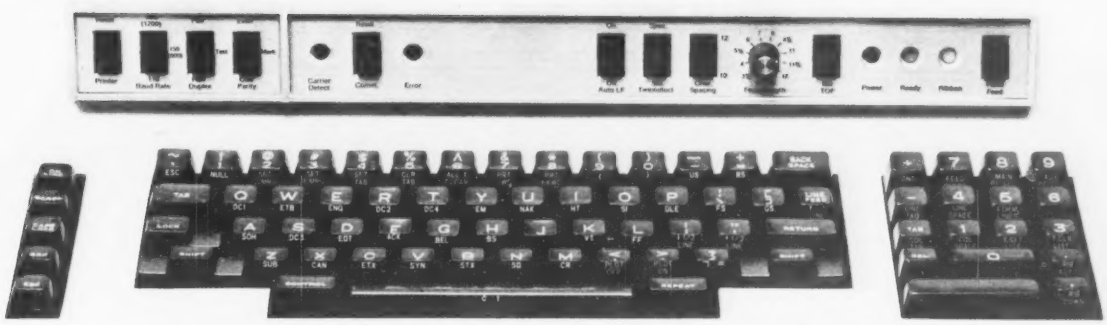

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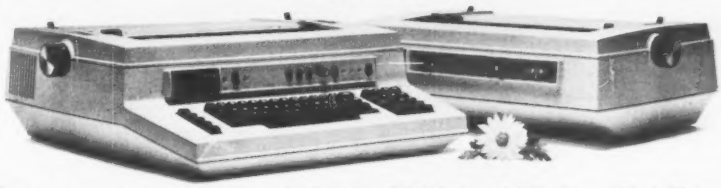

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Basic Tips Given for Selecting FM Vendor . . .

(Continued from Page 32)
preferred vendor. The numeric score was helpful in making the final selection because it highlighted the major differences among the vendors' proposals.

Contract Arrangements

Once the vendor has been selected, entering into an arrangement for FM services should also be approached with thought and care, Ivan Serchuk, attorney for Serchuk, Pisani & Wolfe of White Plains, N.Y., advised the seminar group.

"We've found that the most comprehensive contracts are often negotiated on a two-tiered basis," he remarked. "On one tier, the lawyers operate and on the second, the highly skilled consultants."

He explained that the two-tiered approach usually results in a two-part contract; the first sets forth the legal rights and obligations of the respective parties, and the second states the technical standards that must be met.

"Obviously, both your lawyer and skilled consultants should have a good, working knowledge of both DP and bank operations if they are to do a thorough job," he commented. "Negotiating a DP contract is not a 'do-it-yourself' job, so select your team carefully."

DPers, he recalled, once thrust three- or four-page preprinted agreements under customers' noses, told them that they were not negotiable and walked away with big, fat, one-sided contracts.

In general, he continued, those days are gone forever. It's now recognized that the terms of such contracts *are* negotiable and that it is much less expensive, in the long run, to devote enough time to obtain competent, professional assistance for developing a favorable contract.

"The stakes are so great that even with a modest improvement, long-term financial benefits can result," he added.

Use Check List

An FM contract cannot be bought off the shelf. It must be tailor-made, juxtaposing the specific needs of the firm against the abilities and experience of the vendor. Accordingly, reference to a good check list and an outline of general contract terms is worthwhile to cover the important issues.

Items in the checklist should include definitions of the parties involved, identification and allocation of conversion costs with a precise timetable and a detailed description of the services the vendor agrees to supply. It should also have a provision governing the quality of the DPer's performance, termination options and ownership of equipment and software.

This is the conclusion of a two-part series. Last week, Mathews defended FM as a worthwhile DP alternative for all kinds of firms. This week, he discusses how to select the FM vendor and how to negotiate a contract for FM services.

Finally, it helps to include in the contract provisions for regular performance reviews. The company should get together with the service representative to discuss the quality of performance and to analyze possible improvements and enhancements.

When a company decides to contract with an FM firm, control is essential to prevent an unreasonable rise in costs, to assure satisfactory operating performance and to provide options in case serious operating difficulties arise.

This control can be achieved by weighing and negotiating all elements of the vendor's proposal, writing a comprehensive contract that includes clearly defined performance standards and implementing an effective, internal communicating approach.

The comprehensiveness of the communicating system depends upon the dollar value of the vendor's contract and other factors. One effective form of communication is the top-level committee approach, much like the one my firm recommended to Connecticut National Bank (CNB), in Bridgeport.

Five-Year Contract

CBN has a five-year, multimillion-dollar contract with an FM vendor. This association, incidentally, is

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considered by the bank to be "a living, breathing thing," requiring continuous monitoring throughout its life.

When the bank first contracted with the vendor, my firm made the evaluation and decided that the expenditures and responsibility were sufficient to justify some appointments of personnel to coordinate the relationship. A vice-president, Stephen Foldy, was selected and designated "the liaison officer," and a steering committee was formed to involve members of the bank's senior management.

Foldy, who performs this function on a full-time basis, was chosen because of his extensive knowledge of the bank's operations and his systems analysis and project management skills.

In his duties, he has no direct-line responsibility and answers only to the chief executive officer. This helps assure complete impartiality in the application of the DP resource.

The liaison officer's job is to plan, evaluate and coordinate the needs of the bank's department heads with the site manager of the FM firm. The liaison officer also prepares the agenda for steering committee meetings.

The steering committee meets once a month to review the plans, performance standards, administration and problems of the DP operation and to take part in the joint establishment of priorities.

The meeting agenda includes such subjects as the quality and quantity of processing, the progress of the systems and programming plan and the proposed plans for the DP facility.

Committee Review

As the committee reviews records and performance reports, it notes the lengths of time used for the computer, for keypunching systems and programming and for collating and bursting reports. Downtime and uptime are observed, and attention is given to the efficiency of newly installed systems, such as the bill-paying-by-telephone service.

When the steering committee decides to implement a system, a detailed implementation schedule is prepared. Responsibility for implementing the system and reporting on its progress is assigned to the FM firm's project manager. Changes that affect the project's scope and completion are jointly agreed to by the liaison officer and the site manager.

The committee also reviews a report card summary with feedback from the user departments on the quality of the service they're getting from the DP operation and comments by the site manager.

Bright Future

For computer services of every kind, I foresee great advances, especially in the banking and finance field. FM will continue to play a very active role along with service bureaus and time-sharing firms.

Computer service alternatives will expand, enabling banks — and other types of businesses as well — to select a little of one kind of service and something of another kind to meet their requirements.

Organizations of all sizes will be shopping for the best combinations of computer resources. Like today, a company's needs must be identified before the vast number of future services and mainframe and minicomputer alternatives undergo evaluation.

At each company, someone must be knowledgeable about all reasonable alternatives. That person — perhaps a department head — will either know or be responsible for finding out who the vendors are. That person should also determine who will solicit proposals, evaluate them, negotiate contracts and help his company gain the greatest possible benefits from the services.

Richard S. Mathews is a management consultant in banking and finance and has been negotiating FM contracts for clients since 1972.

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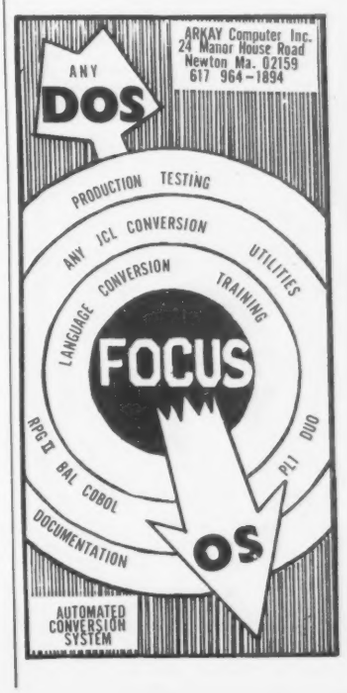

Packard Torn on Topic of U.S.-Japan Trade

(Continued from Page 31)

came more and more to embody in a single speaker the multiple viewpoints the question generated.

You see, he was torn. Something like half of HP's business is international. It manufactures in several countries and sells in dozens of them.

Wearing that hat, Packard has to be a free trade supporter. Of course, he could and did turn it around by advocating less protectionism — both official tariffs and unofficial obstacles — for our exports to Japan. But he had to warn against raising barriers at our own borders and inviting retaliation.

Then, Corrigan had complained of how little help he and the semiconductor industry got from our government and how much trouble it caused him. I'll return to that later. He had also talked about the Japanese Ministry of International Trade and Industry (Miti) and the funds it helped distribute.

But Packard had signed off on literally billions of dollars worth of Department of Defense contracts, and he *had* to remind the audience how this had helped them and their end-user customers and how scarce such funding was in Japan. I got a flavor of "But what have you done for me *today*?" at some of the nearby tables, of course.

Advocated Concessions

On the other hand, he blew the old protectionist kazoo pretty hard. He actually went so far as to advocate that the purchasing people present go beyond purely monetary considerations and lean over backward, at least a little, to buy American; I was startled. Moveover, he just couldn't resist a Republican plug or two for lower capital gains levies and the like.

Although he followed Bender and said he intended to comment on the remarks of the earlier speakers rather than give a prepared address, Packard did not refer to one interesting comment made by the NEC man.

Referring to implications that Japan, Inc. did not have to contend with antitrust, Bender said pretty forcefully that Japanese firms did not indulge in cross-licensing and second-sourcing, which are ways of life in Silicon Gulch and among its major customers.

Two other points came to mind as I listened to the panel and to Packard in particular. One was that nobody mentioned IBM. Bender told me later he usually does, but he had too many other points to make and too many figures to quote (such as that U.S. firms have 26% of the Japanese semiconductor market and 50% of its computer market), to add IBM to the picture. Clearly, IBM does very well indeed in Japan and far better than any Japanese firm does, or hopes to do for decades, in North America and Europe.

To one who had recently heard in Torremolinos the Algerians and the Nigerians and the Bengalees inveighing against IBM and the U.S., Nippon Electric, Fujitsu Ltd. and Hitachi Ltd. sounded pretty innocent. As Bender and the Palo Alto seminar speakers said, Americans ought to do a better marketing job in Japan. Sell American, say, rather than buy American!

Sore Point

The other point was a sore one with me, as I recalled my tangled attempts to be a Standards bureaucrat. Here were these people — not just the panel, but almost everybody in the audience — complaining about Washington (I do it myself, of course, especially about the horrid State Department!).

They call our appointees and civil servants second-raters and contrast them with their Japanese counterparts, who have chosen life careers with the ministries after leaving the universities and prize the opportunity beyond pearls. Above all, they call the Washington and Sacramento people enemies who work against business rather than with it.

But that is very much a double-edged sword. Who would work for government here, in a milieu where big business has the prestige, awards the big salaries and perquisites, runs powerful lobbies with Congress and the state legislatures that can tie the civil servants up in knots and in general is The Only Game In Town?

The answer, obviously, is second-raters and people who — either by conviction or because they have been passed over — dislike business, business methods and objectives and business people.

Over and over again, explicitly in Packard's and Corrigan's speeches, implicitly even in McCloskey's, I could hear a broader version of Engine Charlie Wilson's aphorism. He said, "What's good for General Motors is good for the country."

These men had a broader view: "What's good for industry is good for the country." That's a vast improvement. But it's a big country.

I saw and heard Packard struggling with that size and diversity. He spoke for the electronics manufacturers, yes, but every once in a while his concern for the rest of us — for our prosperity, our security, our happiness — came through. I liked those parts best.

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Senior Vice President, Research and Development, Datapoint Corporation

"Distributed Systems Architecture and Processors." Distributed functions, control, processing, databases: what are the present and future economic trade-offs?

Dr. J. Egil Juliussen
Senior Member, Technical Staff, Texas Instruments Corporation Engineering Staff

"Semi-Conductor Technology: Driving Force for Computer Systems." Can current computer architecture/designs effectively utilize 64K storage chips, bubbles, CCDs, fiber optic cables, etc.?

Dr. Eugene I. Lowenthal
Vice President, Advanced Product Planning, MRI Systems Corporation

"Database-Centered Architecture and Processors." The back-end file processor's impact on the user and vendor; strengths/weaknesses of the database-processor approach.

Asa W. Lanum
Director, Product Software Development, Amdahl Corporation

"User Opportunities to Improve Software Investment Pay-Off." Can new software be combined with old to produce more effective end-user operation? How does hardware enhance or stifle the potential?

C. Oakley Mertz,
Vice President, Research, International Data Corporation

"The User Customer Base and Systems Migration Dynamics; Impact of Distributed Processing." IDC's migration study—how fast are users moving to newer systems, networks (SNA/SDLC) and distributed processing? What is the likely impact on computer usage in the 1980's?

James E. Thornton
President, Network Systems Corporation

"New Alternatives in Systems Architecture." Will conversion/migration between non-compatible systems be easier by 1982/83? More or less costly? And what innovative architecture choices are open to users now?

James McGuire
President, Computer Division, National CSS

"Computer Services, User Hardware Hybrid Systems." Why are the service companies now supplying their own hardware? What's next?

Dr. James W. Jewett
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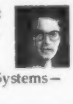
"Communications Systems—Optimizing 1980 Alternatives." How can users select from new carrier offerings in the packet and satellite areas? What compromises and trade-offs are needed with existing communication network investment?

Additional speakers to be announced.

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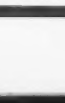
"Planning to Manage the New Systems Technology in the 1980's." Managing and adapting to fast-paced changes in technology and marketplaces; cost-benefits analysis and cost control.

Auditing Goals Listed

By Richard A. Varconda
Special to CW

I completely agree with Herbert Reichlin regarding the need for a person to satisfy the goals he described in " 'Systems Planning Ombudsman' Needed" [CW, Dec. 11]. I would suggest, however, that his ideas are not new.

The following are some objectives for auditing "Systems Under Development" listed in the 1975 Institute of Internal Auditors' publication, *Hatching the EDP Audit Function*:

- To verify the design of financial and processing controls, ensuring the completeness of input, the integrity of processing and the correctness of output.
- To ensure the proposed system will meet the user's real needs.
- To determine that plans for development and implementation are realistic and provide for adequate user training.
- To determine that control over file conversion is adequate.
- To ensure that overall operation is under control during its initial operating cycle.

Varconda is audit administrator with Finance America Corp.

Reader Commentary

Tax Mess Can Be Solved

(Continued from Page 31)

is an even one. This is not a mathematical, but a programming problem. The format of current programs assumes that the multiplier is a single number with no decimal positions.

No one will have provided spaces for dividing by part-days. But this will be necessary when the monthly payrolls are run in a week or so. Thirty divided by 5/7ths is not exactly 21 or 22.

And the programs don't have room for any other type of figure unless formats are changed, the number of necessary decimal points are decided on and so forth.

The second problem will crop up when the table is used for calculating pay periods other than weekly, biweekly or monthly — the true miscellaneous problem that this table was supposed to solve.

Systems normally use a Julian calendar, which is simply a count of the days in the year ranging from Day 1 (Jan. 1) to Day 365 or 366 (Dec. 31).

To find out the number of days in a pay period using the Julian method, subtract the first day (Julian) from the last day (Julian). For instance, Day 59 comes 10 days after Day 49. That is simple.

But how many *business* days is that? You can't tell without working out to what days of the week the Julian days are related. And that takes extra programming.

But there isn't time to do this.

A solution exists, however (See box). Simply go back to the old calendar way; change the parameters — reduce each of them by 2/7ths — and run the old programs. As I see it, that is the only way to stop further chaos.

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Readers Grab For DP Paper

(Continued from Page 31)

fantastic! Our group is attempting to get top management involved with computers. We were very amused by your experiences and can relate to them all too well. In fact, we are resorting to phototypeset handouts for the first session. I will be happy to forward our experiences when we have completed our 'mission impossible.' "

- Belgium: "The three rules in your article entirely reflect my experience of information systems executive training.

"One ploy in applying Rule 1 is this: Once the first terminal exercise has been completely understood, ensure that no instructor, programmer or other DPer is available to assist — even at the end of a telephone. A few seconds staring at a blank screen — particularly if there is known to be a group of similar level executives in the next office tackling the same problem — will soon persuade the skeptic to get his hands dirty."

And some final comments for your reading pleasure:

- Connecticut: "This is certainly one of the most challenging and least productive areas in our industry . . ."
- Illinois: "I suspect that you have touched a chord in almost every company in the U.S. and we are no exception . . ."
- New Jersey: "I have appreciated your articles and heartily agree on the challenge involved in getting an achiever who has not had DP exposure to make an honest effort at learning about it . . ."
- California: ". . . And shame on you for not knowing that the second ounce goes for 13 cents!

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

Host Organization and Registration Information

IITI The International Information Technology Institute, the program manager, is a non-profit organization chartered to provide professional development and educational support to information systems executives. It draws on the skills and experience of highly qualified consultants, users, vendors, and university researchers to address key issues in information systems planning, applications, computing economics and technology assessment. IITI programs emphasize practical presentations by skilled speakers, as well as audience involvement in pre-conference studies and issue definition.

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Fourfold Problem

Most Systems Auditors Not Experts in DP

By Howard A. Karten
CW Staff

A recent commentary, "Systems Auditor's Job Often Misunderstood," contained the statement that the auditor "is also a programmer, systems analyst and computer technician and knows quite a bit about computer operations and security" [CW, Dec. 25/Jan. 1].

I worked for several years in DP as a programmer and analyst. From my experience, and from conversations with others in different companies, I am forced to say this is far from universally true. To paraphrase Shakespeare 'Tis a grievous error, and grievously hath DP answered for it.'

Auditing is certainly a critical part of a well-run DP operation, but unfortunately, it is often haphazardly done.

The problem with most systems auditors is four fold:

- They start out as auditors from other fields, perhaps taking some courses in programming, analysis and operations. But they do not have a broad enough or deep enough DP background.
- Many, perhaps most, of the talented people presently in DP want to remain in DP's mainstream rather than entering an ancillary field such as auditing.
- Many concepts used by auditors are far better suited to nontechnological fields, especially those in which there is hard copy and objects auditors can feel and count. For example, one can set up (from an auditing standpoint) excellent guidelines for developing and running on-line systems. But the demands of these systems, and of the business environments in which they operate, require that from time to time the guidelines be violated to preserve smooth operating.
- Good auditing demands a vigorous, almost adversary relationship between auditor and audited. Unfortunately, the political realities of work are such that most organizations are unwilling to take the steps necessary to make an auditor's job safe — as in the case of Ernest Fitzgerald and the Pentagon some years ago.

Fitzgerald was the Pentagon auditor who "blew the whistle" in 1968 on cost overruns on the Lockheed Corp. C-5A aircraft. He was fired the following year, officially for a reason unrelated to his public testimony, but regained his job in 1973 after a long court battle.

In ruling on the case, a Civil Service examiner commented that the firing appeared to be related to his congressional testimony.

Good Bloodhound

A good auditor actually observes a DP operation, noses around and assumes that those audited are guilty until proven innocent. He starts with the idea that there are flaws in any system, and that given sufficient motivation (i.e., a big enough haul), a talented programmer, analyst or operator can compromise a system.

Consider the lack of DP background in most auditors. An auditor might tell a DPer to show him the listings or show him the listings before and after the changes.

How does he know that he is looking at the right code? How does he know the listing he is looking at came from the production library and that the source code matches the object code in production?

How does he know that it is not "dead" code that will, in fact, never be executed?

Minor Annoyances

In many companies, auditors are regarded as minor annoyances. The result is that the programmer who is asked to show the auditor a listing often will try to "snow" the auditor, or make a fool out of him by deliberately showing him the wrong listing.

The only solution is for the auditor, like any good researcher, to go to original sources — at the production library. To do this, he must be familiar with DP operations and have the skill to obtain the listing and interpret it.

Additionally, a larcenous programmer whose work is being audited could fairly easily replace a larcenous program with a bona fide copy, so the auditor is probably best off not having *any* contact with the DP staff in his work.

One duty of a good programmer or analyst is to be clever. An effective auditor, therefore, should be at least as clever, in case the programmer's cleverness is turned toward bad ends.

Quick Solution

One task I had as a programmer/analyst was to make extensive modifications to an on-line banking ap-

(Continued on Page 40)

Commentary

Today's Output May Be Tomorrow's Outcast

Keep up to date on the state of output in our February 26th Special Report.

The rapid pace of computer output technology is producing an increasingly varied array of equipment that is making current methods obsolete. There are now nearly 100 computer printer vendors, with more than 300 printer or printer families, using about a dozen techniques, ranging from 10 character/second cylinders and balls to sophisticated 14,000 line/minute laser xerography. In addition, manufacturers continue to pump out a wide range of COM units, microfilm equipment and CRT's. And many of these complex systems are becoming feasible and affordable for both large and small companies.

Computer Output Equipment is the topic of our February 26 *Computerworld* Special Report. Edited by Howard Karten, the report will be examining the increasing variety of computer output equipment, with problem-solving tips by users, as well as advice from vendors on topics like:

- *Output selection: hacking through the equipment jungle*
- *Microfiche and microfilm: designing and planning a COM system*
- *Color CRT's and their newfound applications*
- *High-speed non-impact printers: when do they get cost-effective?*

If you want to keep abreast of this ever-changing market, don't miss our February 26th Special Report.

And if you're marketing computer output equipment or services, here is where your ad should be. Call your *Computerworld* representative for further details. He can give you special assistance in ad planning. Or, to reserve space, call Terry Williams at (617) 965-5800. Closing date is February 9th.

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Letters to the Editor

Blind Student Needs Advice About OCR

I have been approached by a student here at Victoria University who has recently gone blind. She has begun studying toward a degree in psychology and sociology, hoping to complete it in 1979, and would like to go on to complete a Ph.D.

She is not yet able to read Braille fluently and relies on people to read material to her.

She and her husband recently purchased and installed in her garage an old, but operational, Burroughs Corp. B500. Her husband is an electronics technician and they hope to modify the B500 to accept input from an optional character recognition (OCR) scanner and to produce output via a voice generator.

She can then have her computer read to her.

Although her husband is an electronics technician, neither of them has had any experience with computers, and they approached me for help. I put the couple in touch with local microcomputer enthusiasts, but none of them have had any experience with either voice generators or OCR scanners.

I am therefore writing in the hope that some *Computerworld* readers can help this couple. If they can, could they please contact the student directly: Alison Wilson, 73 Washington Ave., Brooklyn, Wellington, New Zealand.

C.R. Boswell
Victoria University of Wellington
Wellington, New Zealand

More Analysis Needed

Concerning the Nov. 13 "Taylor Report" [Bank Notices Disturb CW Readers]: Harassment? Collection of Damages? Bank held liable? Be serious! The cause of Mike's "harassment" was his delinquency on his account.

If he thinks Master Charge has an offensive billing system, let him return or destroy his card. Why must people forfeit responsibility for their own actions when reminded of their failure to act?

My opinion of Mike and his predicament is that they are both trivial and not worth the space devoted to them. However, the question of how or why the notices were sent on three consecutive days is very worthy of investigation.

I would much prefer to have this type of analysis in "The Taylor Report" than 1-1/2 columns on someone's personal problems and self-inflicted wounds.

Steven M. Smith
New Carrollton, Md.

Auditors Not DP Experts

(Continued from Page 39)

plication. I tested my changes against a good set of test data, and I knew the changes worked properly.

But when I followed our standard procedure and read the object deck in to be relinked, there was a misread that went undetected.

One byte in the program was inadvertently changed to another in the read process. When the program came up "live," of course, it bombed.

When I found the problem, I told my boss — and his boss — and I outlined our alternatives. The quickest, best solution, I said, was to patch in the correct data through the console. He agreed and we did it.

A bad practice? Absolutely.

Necessary to get back on the air fast and provide the least amount of inconvenience to our customers? Absolutely.

We all recognized that it was poor practice, but felt we had no choice. I wonder what an auditor would have thought. I also wonder how much I could have ripped off, if I'd wanted.

Adversary Approach

Finally, consider the problems of the adversary approach. An effective auditor — no matter how polite and how skilled in dealing with people — is bound to ruffle feathers.

He is a "shoe fly"; his job is to make sure that proper procedures have been followed and that the paperwork is up-to-date. (When was the last time you met someone who meticulously kept up with his paperwork?)

By necessity, he will interfere — to at least some degree — with the normal functioning of the departments involved: the user, the programming staff and the operations department. The better he does his job, the more people he will put off.

How many managements are willing to make it clear — to their companies *and to themselves* — that such an individual is simply doing his job and that his career should not suffer because of it? A quick look at the recent history of auditors who uncover unsavory practices, let alone outright fraud, will show that no one likes a whistleblower.

Good auditing is a necessity today and is certain to become even more critical as more systems go on-line and interconnect. But unless management is willing to give auditors the tools, the training, and the time to do an effective job, auditing will remain a joke — and a dangerous one.

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Random Notes

Index Pinpoints Mark IV Sources

LOS ANGELES — The "Mark IV Systems Index," a cross-reference to all Mark IV documentation, has been published by Informatics, Inc.

The handbook provides a single point of reference for information contained in Mark IV documentation. It cross-references the "Mark IV Reference Manual," special feature reference manuals, operations guides, installation procedures, the "Specifications Digest" and technical information bulletins.

The index alphabetically lists key words, with applicable context phrases.

Copies of the index can be purchased for $5 from the Mark IV Order Desk at Informatics, 21050 Vanowen St., Canoga Park, Calif. 91304.

T/S Net Offers Economic Time Series

WALTHAM, Mass. — The Conference Board Data Base, which includes 739 economic time series, is now available to more than 4,000 qualified firms through the time-sharing network of Interactive Data Corp.

The data base gives Conference Board associates interactive access to the statistics developed by the nonprofit business research organization.

The annual subscription fee is $400, the company noted from 486 Totten Pond Road, Waltham, Mass. 02154.

OS Users Set Meeting

NEW YORK — President Marv Silverman of the OS Eastern Region Group (Oserg) has invited interested people to attend a group meeting Friday afternoon, Jan. 26, at the Chase Manhattan Building, 1 New York Plaza, in lower Manhattan.

Chase's assistant manager for performance at the bank's corporate data center, Larry Beck, will discuss hardware monitoring.

For planning purposes, Silverman has asked prospective attendees to contact him at Consolidated Edison, 4 Irving Place, New York, N.Y. 10003.

NCR Translating Programs

DAYTON, Ohio — Programs written in RPG or RPG-II for IBM, Univac, Burroughs Corp. and Honeywell, Inc. systems can be translated into the latest standard version of Cobol 74, for use with the NCR 8000 series CPUs.

Under the plan, users can send the company RPG and RPG-II programs on magnetic tape, and NCR will return Cobol code and listings.

The service charges would amount to about $10 for a typical RPG program with 150 source lines, a spokesman said.

'Concerted Effort' by Users Vital to Good DP Work: Weiss

By Harvey M. Weiss
Special to CW

Strong commitment to a good user-DP relationship, so often cited as the key to good systems, doesn't just happen. It takes a concerted effort on the part of the user, especially if he suddenly feels — to his surprise — that the DP staff really doesn't want such an active relationship.

But the risks to the user in not making the commitment are significant and perhaps symptomatic of even more serious problems within the organization. If the user allows DP to define the work it will do for the user, for example, it suggests the user organization has no control over its own destiny.

It is also an indication the user has not yet learned how to manipulate DP as a tool in order to meet his needs.

A second symptom related to the missing commitment is the user relinquishing his authority over systems design and allowing his "expert" — i.e., DP — to design the solutions.

This symptom, combined with another that may arise — the user not being able to state his problem explicitly — will allow DP to take control of the relationship and more than likely design the wrong solution to the wrong problem.

The fourth symptom is DP-oriented. Simply stated, it is that DP does not know its place in the corporate structure.

DP departments that do not possess written charters which define their place, goals and objectives and the results expected by the user cannot perform as required. The lack of such orientation at the DP management level permeates to the lower levels and can be seen in systems designs with no firm set of objectives and constant changes, never-ending projects and a lack of standards for evaluating performance.

This article was adapted from a speech consultant Weiss made at a recent meeting of the University Computing Co. Financial Industries Users Group. The speech was entitled "Keeping the User-DP Marriage From Going on the Rocks."

If one were to develop a prescription to solve the problem of the lack of a user commitment to its DP effort, I believe it would take the following forms.

First, DP and the user would establish a set of written goals and objectives. These would spell out the philosophy of DP in the organization.

I hope this philosophy would define DP as an extension of the user's department, unable to function without user involvement in all phases of system design, development and maintenance. The user would know what role he is to play, and the DPer would also understand his role in the marriage.

Specifically, the philosphy would state that DP is a staff function. Computer systems belong to the user, not DP, and thus DP must relegate itself to the user. This the DPer may not like, but must accept.

The second step in eliminating the commitment problem would be for the user to require DP to prepare and maintain a long-range plan. In building this plan, DP will be forced to acknowledge the fact that only the user knows his needs.

It will also be a tool to ensure that DP will have sufficient hardware, software, personnel and facilities to meet the user's needs now, in the near future and in the long term.

The third part of this prescription would be for DP to develop a standard methodology for itself. Without standards, it is impossible for DP to design, implement and evaluate the systems the user requires.

The standards that are spoken of here are not the ones that, say,

(Continued on Page 44)

Datapoint 1800s Gain Multiuser 'Datashare'

SAN ANTONIO, Texas — Datapoint Corp. has made the Datashare business-oriented time-sharing system available for use on the company's 1800 processors. With this facility, up to four local or remote users can enter data, execute programs and complete other business tasks, all from a common data base, according to a spokesman.

Datashare support for the 1800 permits concurrent execution of the same or different programs written in Datashare, which Datapoint said is the multiuser member of the Databus family of high-level languages. Each program is allocated up to 32K bytes of virtual memory, the spokesman noted.

The software can work with random, sequential or indexed sequential disk files. In addition, the use of the standard Datapoint file structure permits Datashare programs to read and process files generated by any other Datapoint language or utility program, he claimed.

The 1800 Datashare software maintains each program's data areas in main memory for faster program execution; data areas are independently configurable from 256 to 4K bytes. Datashare also makes use of the Databus libraries to permit efficient use of diskette storage and to boost program execution speeds, the spokesman added.

The system supports any teletypewriter-compatible device for use as a workstation, as well as any Datapoint terminal. The transmission rates for each terminal devices can be set indepen-

(Continued on Page 45)

'Clue' Enhanced

BETHESDA, Md. — Release 2.2 of the Compiler Language Utility Extension (Clue) package from U.S. Robots, Inc. has nearly twice as many functional modules as before, making it an even better "tool box" for IBM 360 and 370 OS programmers, according to the vendor.

Composed of reentrant modules written in Assembler language, the package gives programmers access to system facilities that can help untangle programming problems arising from the use of any language with standard OS linkages, the spokesman said.

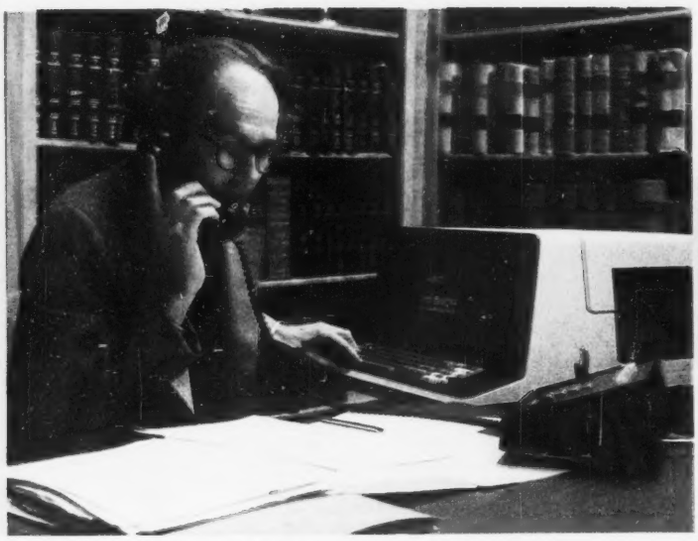
Examples include cataloging, uncataloging and renaming a data set; determining the amount of space left on a disk volume; attaching and detaching subtasks; and Abending a task or step, he recounted.

Among the functions that have been added with Release 2.2 are a "loop monitor" module that helps prevent looping errors during debugging and a timer module that allows compiler programs to track their own CPU usage.

Several single- and double-precision mathematical routines, an enhanced Volume Table of Contents (Vtoc) reading capability and "a number of other functions along the same general lines; are also included in the update, the spokesman said.

The package has been enhanced to provide both static and dynamic calling and to include information needed for establishing the appropriate LINKLIB and STEPLIB libraries, he added, noting also that installation of Clue itself has been simplified by shipping the program on tape in IEBUPDTE-compatible format.

Clue is available for $3,000 for a user's first CPU with a $1,000 charge for extra CPUs, U.S. Robots said from 4901 Fairmont Ave., Bethesda, Md. 20014.



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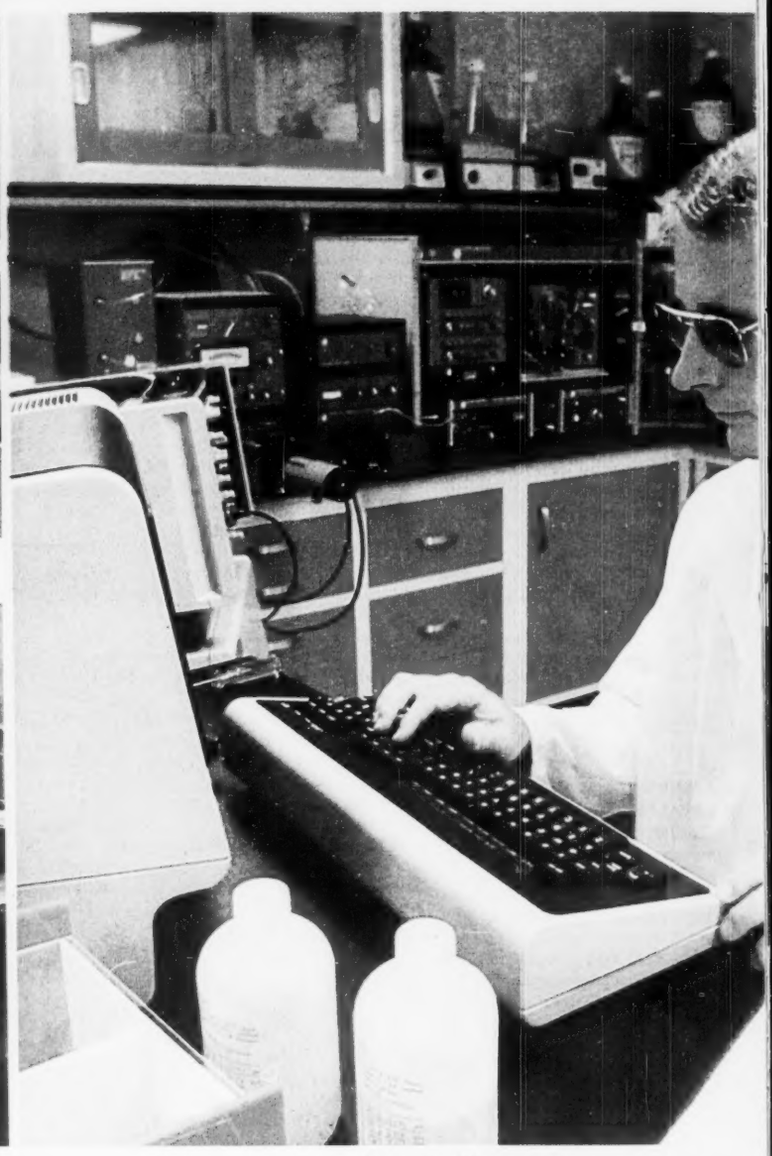

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Distributed processing is a reality. The economies of scale have dramatically shifted from centralized, batch-oriented machines to distributed, interactive processing and networks.

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One question remains: how to acquire and exercise control of data. For is it reasonable to permit such autonomy that data remains unshared? Is it reasonable to permit such independence that all information is isolated, and then duplicated elsewhere, again and again?

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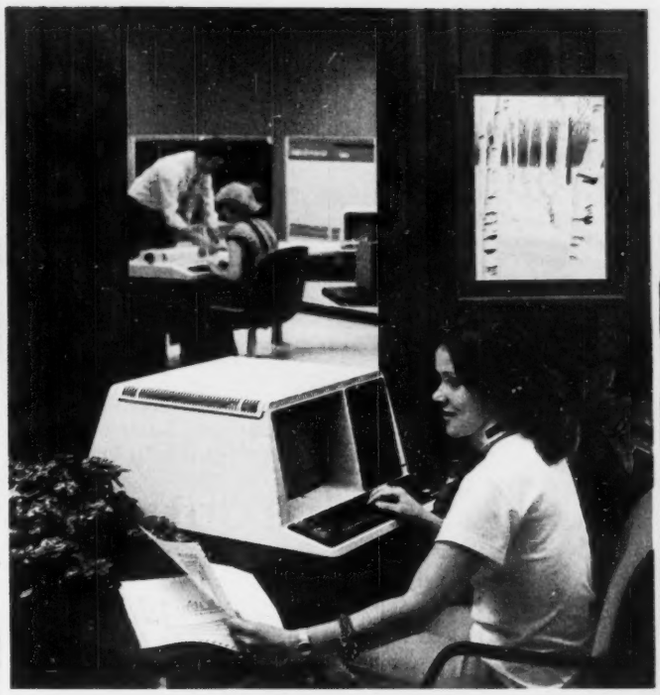

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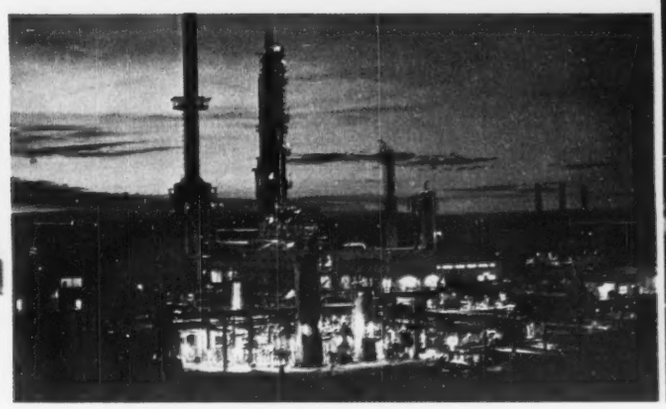

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DEC Dealers Get Software

MERRIMACK, N.H. — The Digital Integrated Business System (Dibs), described by Digital Equipment Corp. as the first application package it has produced for commercial OEMs, is tailored for DEC 308 and 310 Datasystems.

Dibs is made up of support for accounts payable; accounts receivable; payroll; invoicing and inventory control; and general ledger accounting. Each module is programmed in Dibol and runs under the COS-310 operating system.

Documentation

Included in the Dibs package are management guides; general operating procedures; system documentation and appendices of recovery procedures; a glossary; and data entry format rules, according to a spokesman.

As a complete package, Dibs costs $10,000, but individual modules are available for $2,500, he said from DEC's Commercial OEM Group offices here in Merrimack, N.H.

User Effort Vital to DP

(Continued from Page 41)

define flowchart symbols. Instead, I am speaking about standards that describe how systems are designed and at which points the user must participate in order to ensure a successful design.

Reviewing Systems

I am speaking about standards for reviews of implemented systems to ensure their continued success. These are the standards that implement the philosophy defined in the written goals, and they are used in developing and maintaining the long-range plan.

The one situation that gets DP into trouble with the user is its inability to say "no" to the user as far as schedules, deals or impossible dreams are concerned. Systems cannot be developed overnight.

IBM Text Programs Back Printers

WHITE PLAINS, N.Y. — Two text processing program products that support computer-assisted printing applications have been introduced by IBM.

The Document Composition Facility (DCF) program is said to provide the ability to do full-page makeup and print pages of text. Also available is the Document Library Facility (DLF), a program that enables text pages to be stored for later recall or printing, a spokeswoman said.

When used with an IBM 3800 printing subsystem, Script/VS — the base position of DCF — permits the intermixing of several character sets for effective page composition, she said.

Text material may be entered at terminals or CRTs with editing facilities under monitor systems such as IBM's CICS or Time Sharing Option (TSO), the spokeswoman said. She added, however, that work under TSO or the VM/370 Conversational Monitor System (CMS) requires an extracost extension of the basic DCF.

Script/VS can also be used as a preprocessor to prepare document text for other programs, such as those that provide formatting support for photocomposition systems, she noted.

DCF costs $185/mo; the Foreground Environment Facility — to support TSO and CMS — is available for $35/mo.

DLF can be used to store information and documents which have been prepared by IBM's 3730 Distributed Office Communication System or material prepared by magnetic card word processing systems, the spokeswoman continued.

The library facility program can be acquired under license for $80/mo.

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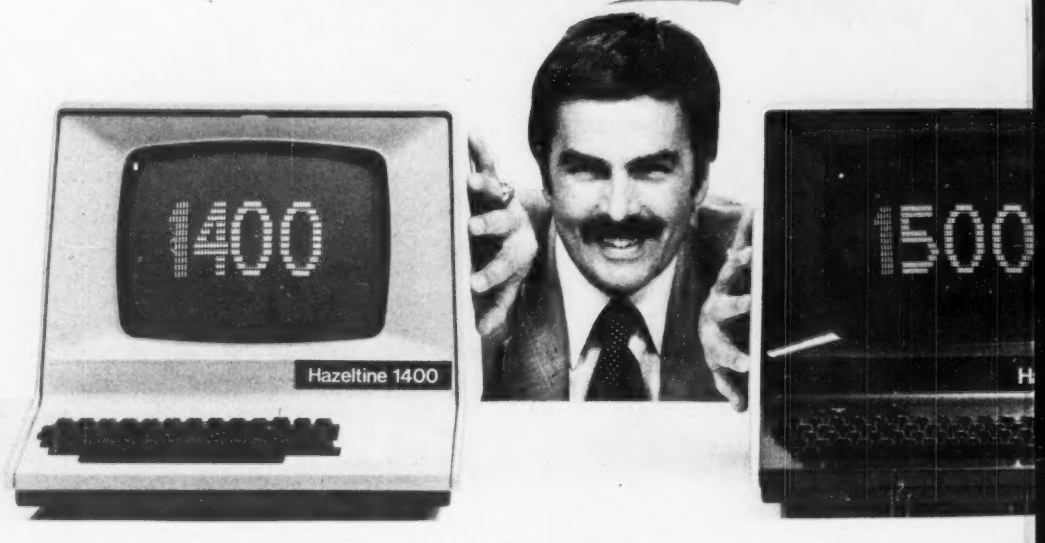

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BC/7 Drives 'JSCS'

BLUE BELL, Pa. — A highly modular package for the manufacturing and printing industry, the Job Shop Control System (JSCS) is now available from Univac for use on its BC/7 small business computers.

Supplied by the Minneapolis-based DCD Co. under agreement with Univac, the system is said to contain modules to facilitate job costing, labor efficiency, production control, purchasing integrated with job costing and raw material inventory control.

It can also support a methods file to ease the setup of repeat jobs, integrated payroll, sales analysis, accounts payable, accounts receivable and general ledger.

Needs 48K Memory

JSCS can be installed on BC/7s with 48,000 bytes of main memory and 3M bytes of diskette storage. The basic license fee for the software ranges from $5,500 to $8,500 depending on the modules and options selected.

Seminars on Methods Set

CINCINNATI — The M. Bryce & Associates, Inc. Technical Institute has scheduled sessions of a "Structured Systems Methodologies Seminar" to assist senior technical and development management in evaluating the various methods, tools and techniques for information systems design on the market today.

The seminar lasts a day and a half and examines structured programs, data, modules, design, analysis, systems, software engineering, and management techniques. It briefs the student on the more prevalent authors of structured methods, such as Dijkstra, Wirth, Jackson, Warnier, Myers, Constantine, DeMarco, Sarson and Gane, Yourdon, Orr, Tiechroew, Ross and Bryce.

The MBA Technical Institute's North American schedule includes sessions in Edmonton (Feb. 22-23) and Cincinnati and Toronto (both on March 29-30). Registration is $300 and includes handout materials.

More information is available from the MBA Technical Institute at 1248 Springfield Pike, Cincinnati, Ohio 45215.

1800s Gain 'Datashare'

(Continued from Page 41)

dently for speeds ranging from 110- to 9,600 bit/sec.

All Datashare programs can be executed from the 1800 console with modification, he noted.

The 1800 Datashare system is said to make wide use of prompting messages and menu-type screen displays to ease system configuration. The DSGEN facility permits relatively untrained operators to implement a data entry, validation, print and update system without undue strain, the company explained.

The 1800, introduced last autumn, supports both interactive and batch-oriented ANS Cobol, Basicplus, RPG-plus, Dataform and Assembler in addition to Databus including Datashare.

For current Datapoint 1800 users, the Datashare software is available "for the cost of the distribution media, or about $25 if a diskette is used," the spokesman concluded from 9725 Datapoint Drive, San Antonio, Texas 78284.

Announcing Hazeltine 1410.

Built and backed by Hazeltine...the company whose microprocessor-based Hazeltine 1400 and 1500 series have set the pace around the world for TTY-compatible video displays.

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COMPUTERWORLD

Getting 10% More — Part 1

Six Areas Seen Targets for Better Throughput

By John Zipp
Special to CW

Over the last several years, throughput improvement has become a key goal of most DP centers. In many instances the crunch came about because of budget tightening. Other centers experienced an explosion in the volume of existing and new applications.

The approaches taken by DP management to fulfill throughput goals have been varied.

Many installations have brought in hardware and software monitors to fine tune their configurations. Others have made hardware changes to achieve better price/performance. But no installation is immune to senior management's coming back again and saying, "All right, now give me 10% more."

Is there any other general area that offers data centers the opportunity to achieve such substantial improvements?

Major Opportunity

We believe there is a major opportunity in the area of minimizing the impact of day-in-day-out system problems as they occur.

Imagine the impact in the average installation if unscheduled software outages and subsequent initial program loads (IPL) were eliminated; or if those periods of sluggish performance when an IBM 370/168 runs like a 158 were eliminated; or if tools were available to the operations and systems support staffs to ensure that system resources went to the most critical jobs in the system, for example, to guarantee minimum on-line system response time.

Measures in a wide range of installations show that such periods of system outage, sluggish performance and suboptimal use of system resources cause a 10% to 30% reduction in efficiency and throughput.

Industry studies have further indicated that the prime causes of such real-time inefficiencies fall into six major categories.

By improving the efficiency of the operations or systems support staff in handling each of these areas, an installation can reclaim several percentage points of improved throughput. A product, service or capability that attacks each of these six distinct areas can and will return substantial savings.

The first of the six areas is unscheduled system software outages and sluggish performance.

John Zipp

What is the impact of a crash and an IPL? At best, the user has lost from 15 minutes to an hour of system uptime. The loss includes the job rerun time for those five to 15 jobs that were running at the time of the outage, the lost time associated with company personnel sitting in front of dead terminals and the user service impact of those production jobs that will inevitably be late because of the outage.

A large insurance company has estimated the cost of an unscheduled IPL to be in excess of $4,000.

In several new system releases, such as IBM's MVS, the incidence of system outages has been dramatically reduced. However, this has been replaced by graceful degradation of performance where the machine never dies, but slowly fades away, slowing down until the only alternative is an IPL.

Industry studies have shown that the causes of software outages are remarkably consistent between installations regardless of industry type or machine/operating system mix. In IBM non-MVS installations, RESERVE lockouts, enqueue conflicts, looping jobs, missing I/O operations and paging thrashing consistently cause more than 80% of all IPLs.

In MVS, IPLs have been replaced by sluggish performance and Systems Resource Manager (SRM) misallocation of system resources, and Auxiliary Storage Measurement (ASM) problems are the underlying cause of a similar proportion of these problems.

What is most interesting about such outages is that again and again we are told by the installations staff, "If we had only known that the problem was a RESERVE lockout, we could have done something about it." The key, then, is providing appropriate information to the system support staff and doing so in a timely fashion that allows action to be taken in real time to address the problem.

When a call comes in from an on-line system user who

(Continued on Page 48)

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'Pacer II' Uses CICS

DALLAS — An on-line accumulated transaction journal system for banks, Pacer II by Pacesetter Systems, Inc. has recently been adapted to run under IBM's CICS and Vsam. Previously, the system was installed only at banks using University Computing Co.'s data base and data communications systems.

Pacer II software was designed to provide terminal service to bank employees engaged in solving customer account problems, a spokesman said.

Display and Use

The information available for display and use by the employees includes account control and transaction information for demand deposit, savings, installment loan and other customer accounts.

The system makes use of data contained on existing files and maintains a data base for on-line retrieval as required, the spokesman noted.

The package is available under license for use on CPUs at a single computer site for $10,000 plus a charge for installation support, if desired, the spokesman said from Pacesetter's office at Suite 1053, 2828 Forest Lane, Dallas, Texas 75234.

'Timetable' Aids Plans

KANSAS CITY, Mo. — Based on the Critical Path Method (CPM), the Timetable system now on the United Computing Systems, Inc. (UCS) international remote computing services network Uninet, is said to be a comprehensive system for planning, scheduling and monitoring complex projects by network management methods.

The system consists of a remote-batch program with an optional time-sharing preprocessor for data entry and job submittal. Developed by Accuratech of Houston, Timetable augments basic CPM concepts with features that include multiple diagramming methods, according to a UCS spokesman.

In addition to activity-on-arrow and activity-on-node networking techniques, the precedence method is available to illustrate specific activity timing restrictions, he said. Only one input card is required to specify an activity, but 15 others may be used to amplify the base specification, he added.

User Reports

More than a dozen standard logic and schedule reports are produced by Timetable for use in project monitoring and analysis. User-defined reports are also available to meet specific requirements, the spokesman said.

The system is user-oriented and requires minimal time and effort for input, report interpretation and other management support, he said from UCS's offices at 2525 Washington, Kansas City, Mo. 64108.

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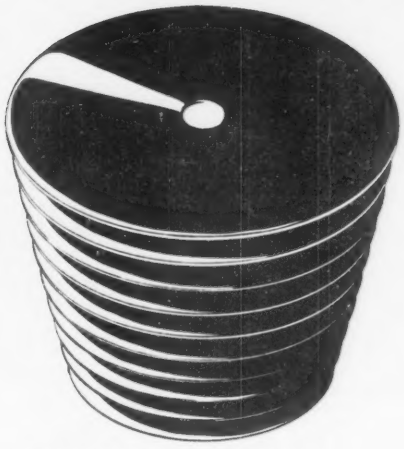
IBM HAS A LOCK ON DOS

DFAST IS THE KEY



Five years ago, Tower Systems, Inc. pioneered the concept of a disk management system for DOS users. Today, DFAST is the most extensively used disk management system in the world. And for good reason. DFAST provides more features, offers greater versatility and is supported better than any other similar system. Over 400 DFAST users world-wide can attest to that.

DYNAMIC FILE ALLOCATION

DFAST allocates file space from available area on a disk pack. The user is only required to specify the number of tracks for a file, not the starting relative track number.

AUTOMATIC SECONDARY EXTENT GENERATION

When a disk output extent has been exhausted the system will automatically generate additional extents with no operator involvement or JCL modification.

ALLOCATION BY LOGICAL RECORDS

Disk allocation may be requested by number of anticipated logical records. The system will calculate the correct allocation based upon the available DASD device types.

AUTOMATIC VOLUME RECOGNITION (AVR)

The AVR feature of DFAST allows the system to automatically make logical unit assignments by the serial number in the EXTENT card. DFAST will make these assignments if the logical unit is unassigned or assigned to the wrong pack.

PUBLIC SPACE MANAGEMENT

DFAST will allocate area within a user-defined pool of disk drives.

DEVICE INDEPENDENCE

Programs may be run on any DASD device type without re-compiling.

GENERIC DEVICE INDEPENDENCE

DFAST allows the generic device type to be changed at execute time. Disk files may be changed to tape or vice versa without re-compiling the problem program.

ENQUE/DEQUE OF DATASETS

Files may be protected across partitions at execute time.

PRIORITY FILE DISTRIBUTION

User may define the search priority for allocation. Avoids stacking all files on same drive. Provides up to three-fold increase in thruput. Enhanced 3344 support.

FILE CONCATENATION

DFAST allocates files as close together as possible, thus eliminating unwanted seek time between files on the same pack.

FILE PROTECTION

DFAST allocates area from any available space on the disk, thereby making it unnecessary for operations to delete unexpired files.

ALLOCATION ON TRACK BOUNDARY

Allocation of files is by track boundary resulting in more efficient DASD utilization.

FILE DELETION

The DFAST system supplies a support program that will expire files by file name. This program may be included in production job streams to delete files when they are no longer needed by the system.

PARTITION INDEPENDENT

DFAST provides a facility for maintaining file uniqueness between partitions. This allows the same file name to be used by more than one partition at the same time on the same disk pack.

TRANSPARENT TO DOS

DFAST requires no modifications to the DOS Supervisor, JCL Language, or user Programs. DFAST is DOS and DOS/VS release independent and is compatible with all other software packages.

HARDWARE SOFTWARE COMPATIBILITY

DFAST runs on any model 360 or 370 using the DOS, EDOS, DOS/MVT, or DOS/VS operating system and supports all disk drives (2311, 2314, 3330, 3340, 3344, 3350, 3330 Mod 11).

NO USER CORE NEEDED

DFAST functions in the transient or SVA area and requires no changes to user programs or partition allocations.

RELEASE UNUSED FILE SPACE (SD FILES)

When a sequential disk file is closed, only the amount of area used by the program is protected in the VTOC. The unused area is then available for use by other files. This feature allows the user to make more efficient use of his disk resources.

REBLOCK FEATURE

Allows user to modify block size at execution time without re-compiling program.

PASSWORD PROTECTION

Files may be password-protected to prevent unauthorized access.

NEW FEATURES

GENERATION DATA SETS

DFAST provides capability to retain multiple versions of same file on disk pool.

AUTOMATIC FILE FRAGMENTATION

User may make files "Best-Fit" eligible- provides "Checkerboard" allocation for files.

DYNAMIC DATA SET EXTENSION

DFAST provides automatic file extension and concatenation without program modification.

EXTENDED ISAM SUPPORT

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Cosmic Package Builds Files, Backs Retrievals

ATHENS, Ga. — The Nips 360 Formatted File System (Nips 360 FFS) was described by the Cosmic clearinghouse (which distributes the software) as a generalized information management and analysis system using an English-like control and query language capable of accepting any machine-readable data source that has a definable format.

Developed by the Department of Defense, Release 21/06 of Nips 360 FFS provides the ability to generate, structure and maintain files, retrieve information and output that information in simple or complex arrays on a variety of output devices, a spokesman said.

To meet these needs, the software includes seven major components, he continued. These provide file definition or structure, file generation and maintenance, file revision, data selection and ordering or retrieval, formal report generation, terminal processing and display and miscellaneous utilities.

Nips 360 FFS runs under many IBM environments and requires at least 90K bytes of memory, although Cosmic said core sizes are "relatively noncritical" to Nips. The software will support data files organized under Isam on direct access devices such as the IBM 3330, 2314 or 2311, or sequential files resident on tape or disk units. On an IBM 370 utilizing OS/VS, the formatter will support Vsam files, the spokesman added.

Distributed on 9-track tape and cataloged by Cosmic as DOD-00017, the package costs $2,470, with documentation available for an additional $100.

Cosmic is at Suite 112, Barrow Hall, University of Georgia, Athens, Ga. 30602.

'OBS Wylbur' Features Boost Users' Productivity

SAN FRANCISCO — Version 5.0 of OBS Wylbur from On-Line Business Systems, Inc. (OBS) is said to incorporate various enhancements to boost the productivity of programmers and operating personnel using the system.

Support for a 132-column-oriented window mode full-screen editor was cited by a spokesman as one of Version 5.0's highlights. It allows users to update review and text files while scrolling left and right as well as backward and forward through a CRT display of the file, he said.

Other added features include user-definable Program Function (PF) keys for IBM 3270 terminals and simulation of PF keys for non-3270 devices. A Notify facility signals signed-on users when their work is done and output is ready for review at a terminal, the spokesman added.

The Operations Support System (OSS) added to OBS Wylbur is said to provide complete facilities for scheduling and submission of production jobs. This includes on-line documentation in place of run books or restart/-rerun instructions, he said.

Otherwise, control of access to direct access storage devices (Dasd) has been made more flexible and CPU time consumption has been reduced even when the host mainframe is supporting as many as 30 concurrent users, OBS said.

The updated OBS Wylbur is available now for $17,500 from the vendor at 115 Sansome St., San Francisco, Calif. 94104.

Disk Tool Aids Expansion

ATLANTA — An update of the Disk-O-Tek disk space management system from NCI, Inc. is said to cut sharply into the number of reruns that installations often have to perform — especially when files are expanding rapidly.

While there are various performance improvements in the basic logic, the primary enhancement to the IBM DOS or DOS/VS-based system is the addition of a secondary allocation facility, an NCI spokesman said.

Prior to this, users had to estimate and then allocate sufficient disk space for whatever files they were using. If the running of a job added so much to the file that it exceeded its specified extents, the job would "blow up" and have to be rerun after adjustments were made to the transaction volume or the old extents.

Now, however, when primary space runs out, Disk-O-Tek intervenes to provide the disk space needed without forcing the operator or programmer to spend time — and money — searching for, reorganizing and then allocating sufficient space to rerun the job.

The use of the system-allocated secondary space is essentially transparent to the user, NCI emphasized.

Useful with any disk subsystems supported by DOS or DOS/VS, the package costs $2,750 and is available from the vendor's offices at 3720 Longview Drive, Atlanta, Ga. 30341.

Throughput Can Be Helped

(Continued from Page 46)

emphatically states that response time for the last half hour has been 25 seconds rather than 5 seconds, what do you do?

How do you determine where the system resources are being spent? Even if you know, how would you take action in real time to focus the system resources on your critical real-time workload?

The sad fact is that today you don't have either the tools or resources to do either efficiently without some type of outside assistance.

For example, a job already in execution must be restarted if there is a need to dramatically change the system resources available to it.

Of late, however, hardware manufacturers have been touting systems software that is much better equipped than any in the past to make system resource allocation determinations. IBM, for instance, has introduced Dynamic Dispatching Groups in VS, Automatic Priority Groups in SVS and SRM in MVS.

What is it worth to be able to ensure that the systems resources are going to the truly critical jobs?

A great deal.

An operations staff should not take over the job of the systems dispatcher, but rather have the opportunity to assess what is being done. Sluggish system performance and inability to control critical jobs' progress through the system is a fact of life today. For the near future, these factors make such control necessary if not essential.

In Part 2 of this article, Zipp will discuss real-time operational problems, system warning functions and installation-unique problems that can affect a data center's efficiency.

Zipp is vice-president, sales, for the Operations Division of Boole & Babbage, Inc., Sunnyvale, Calif.

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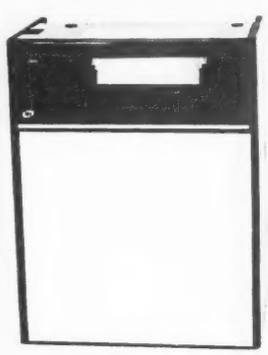

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Turnkey Message System Operates on DEC PDP-11 With 370s, Other Hosts

By Ronald A. Frank
CW Staff

NEW YORK — An intelligent turnkey administrative message system that can interface with IBM 370 and other host mainframes has been introduced by DDP Products, Inc.

Supporting a variety of otherwise incompatible terminals and transmission protocols, the MS/11 Message/Transaction Processing Communications System operates on a Digital Equipment Corp. PDP-11 processor utilizing the RSX-11M operating system.

The MS/11 combines message processing with store-and-forward message switching, transaction processing in higher level languages and interactive processing from a single user terminal, a spokesman said.

Since administrative message systems typically vary widely in the types of circuits and protocols required by a user, the terminal and line control portion of the MS/11 system was designed with a table-driven protocol interpreter that is said to accommodate a variety of protocols with minimum effort.

The system can be configured to support private as well as dial-up facilities and can be interfaced to asynchronous and synchronous multiplexers, current-loop adapters and EIA-type terminal devices. The system can support speeds up to 9,600 bit/sec, and an optional 56K bit/sec synchronous interface is also available.

Among the protocols supported by MS/11 are Ascii, Baudot, point-to-point (2780-type) binary synchronous, interactive IBM 3720, TWX, Telex, AT&T 83B3 and Western Union 117B, a spokesman said.

MS/11 provides multiple-priority categories for message delivery. All error messages and system notices are sent at the highest priority level and other priority levels are accessed through the use of a message ID character in the message header.

A system configurator subsystem provides the user with the ability to segment the network into subnets and station classes with explicit routing rules channeling traffic on a destination and priority basis, the company said.

A traffic file is structured on disk storage to maximize accountability and throughput. The file structure allows messages to be routed and delivered with minimum disk usage. Files are created using RSX-11M organization techniques, and they can be processed off-line with assembler, Fortran and Cobol programs, according to the vendor.

The MS/11 system is provided as a total turnkey capability in two versions with either a PDP-11/34 or an 11/70 for larger systems. Either version can be configured in single or full redundant format. In general, a PDP-11/34 costs about $175,000 for a single system with between 50 and 100 circuits. A redundant version of the same net would cost about $250,000.

A larger version using a PDP-11/70 would cost $350,000 in single mode and $595,000 for a redundant version. The MS/11 system is available within 60 to 90 days from DDP Products, Inc., 132 W. 31 St., New York, N.Y. 10001.

Terminals Improve Alaskan Air Service

Special to CW

ANCHORAGE, Alaska — A series of intelligent terminals is helping a large intrastate airline here carry out a three-year program to upgrade service throughout the state and extend processing and communications to some of Alaska's farthest reaching settlements.

"Poor roads, gravel runways and limited telephone service provide some unique problems in serving the air transportation needs of Alaska," according to James Cook, director of communications for Wien Air Alaska.

Wien is tied in to the Mutual Computer Service worldwide Pars/Ipars airlines reservation network via high-speed communications lines between the Los Angeles reservation computers and Wien's headquarters here.

Until recently, Wien's outermost service points had no regular telephone service, so Teletype Corp. terminals and low-speed communications circuits were the only means of communications to Anchorage.

In 1977 Wien launched a three-phase program to improve air service by adding computer processing facilities and upgrading communications to remote locations. The first phase, now complete, consisted of adding Raytheon Data Systems Co. PTS-100 intelligent terminals in Anchorage, Fairbanks and Prudhoe Bay and moving the Incoterm systems out to replace the Teletype systems in the field.

Teletypwriters Out

For the second phase, all remote teletypewriter systems will be replaced by a higher speed communications system. This follows overall recent improvements in Alaska's telephone system — a system that, for geographical reasons, must combine microwave, satellite and "troposcatter" transmission techniques.

"The third phase, which begins this year, consists of adding more PTS-100 terminal systems to

(Continued on Page 50)

Equipment Lets Mini Users Boost Transmission Speeds

NEW YORK — The Faster Asynchronous/Synchronous Telecommunications (Fast) package offered by Turnkey Sales & Leasing, Inc. reportedly enables any minicomputer user to increase data transmission speeds from 1,200 bit/sec to 2,400-, 4,800-, or 9,600 bit/sec without modifying the mini or software.

The equipment, a separate communications device with cables, is installed and guaranteed operational by Turnkey.

The ability to transmit at 9,600 bit/sec permits remote printer operations at 300 lin/min the vendor observed, adding that with Fast, a CRT terminal in Los Angeles tied into a minicomputer in New York could enter data at 9,600 bit/sec — minimizing interrupts and cutting line costs.

Fast converts from asynchronous to synchronous mode, allowing communications via dedicated lines, direct distance dial or data networks at speeds compatible with the receiving terminal or CPU, Turnkey said. At the receiving end, a converter reverses the mode from synchronous to asynchronous.

The package delivers 2,400 bit/sec performance for less than $190/mo; 4,800 bit/sec costs less than $225/mo and up to 9,600 bit/sec costs less than $300/mo. Turnkey Sales is at 500 Fifth Ave., New York, N.Y. 10036.

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For Two-, Four-Wire Cables

Prentice Unwraps Asynchronous Line Driver

PALO ALTO, Calif. — An asynchronous line driver that provides half- or full-duplex data transmission over two- or four-wire cables up to 14 miles long is available from Prentice Corp.

The driver operates in point-to-point or multipoint/polled mode and is both speed- and code-transparent, Prentice said. The device was designed for use on private-wire short-haul circuits as an alternative to more expensive modems intended for longer distances.

The unit transmits at 4,800 bit/sec for up to six miles and at 9,600 bit/sec for up to four miles on a 26 American Wire Gauge nonloaded cable, the firm noted.

The unit meets Bell specification 43401 and replaces Western Electric Co. 103F, 202R and 202T modems and any other asynchronous modem in the 0- to 9,600 bit/sec range, the vendor added.

No Adjustments

No test equipment or adjustments are required for installation, the vendor maintained.

Each unit reportedly contains built-in diagnostic capabilities, including analog and digital local loopback and eight LED diagnostic indicators — all accessible from the front panel.

The device costs $280 with lease and rental terms available, Prentice said from 795 San Antonio Road, Palo Alto, Calif. 94303.

Alaskan Airline Aided

(Continued from Page 49)

handle the information processing needs of our four next-largest airports — at Point Barrow, Bethel, Nome and Kodiak," Cook explained.

"Before we began the program, data communications traffic was often slower than the airplane flights themselves," he said. "It might take two to four hours to get a message through via Teletype system. Consequently, sometimes the flight would arrive before the message. Our business was growing, but the slow terminals just couldn't keep up with the communications needs.

Ticketing, Too

"In addition, we needed greater power and flexibility in our ticket-counter processing at our busier airports," he continued. "The PTS-100 system suited this need, because it performs stand-alone ticketing, cargo and loading-information processing functions for multiple operators located at different terminals. It also permits high-speed communications within our own network and, from Anchorage, with the Los Angeles Pars/Ipars reservations mainframe.

"Essentially, we've been able to move the existing terminals farther out into the field, and we've replaced them with the PTS-100 terminals at our busiest airports. As a result, cargo and operations personnel at these airports won't have to share the ticket-counter terminals to do their own processing, as they did with the other system," he said.

Miles to Go

In all, airline data must travel many miles to coordinate reservation, ticketing, loading and freight functions. All reservation information, whether generated from Los Angeles or from Alaska, is first filed in Los Angeles, then "pulled" to Wien's Anchorage headquarters when it is needed via transmission over a 2,500-mile, 9,600 bit/sec line. From Anchorage, flight and reservations data is multiplexed and sent to its appropriate airport destinations throughout the state.

"We're currently moving data between Anchorage and Los Angeles at 7,200 bit/sec," Cook said, "because we don't need faster transmission now. But as we add new terminals and programs in the future, we may want to go at the full 9,600 line rate."

Intershake Gains Optional Ipars Test Ability

ALEXANDRIA, Va. — Atlantic Research Corp.'s Intershake data communications diagnostic test system can now be used to test most versions of a communications protocol common to most airline reservation systems.

Atlantic Research has introduced the optional ability to test IBM's International Programmed Airlines Reservation System (Ipars) protocol. According to the vendor, Intershake in the Ipars environment allows error rate/-throughput measurements using a live cyclic redundancy character check. It also provides for measurement and display of system response time with thresholds for alarm conditions.

Intershake is compatible with almost any type of terminal used in the reservation network, Atlantic Research maintained, and can be connected as an on-line passive monitor without disturbing the system.

Intershake's basic programmability lets the unit monitor the network or selectively emulate either the CPU or terminal, the vendor continued.

Moreover, Intershake's keyboard and program development editor reportedly allows the user to program the unit in Ipars language or Ipars Hex, rather than reverse line Hex. The user monitoring an operational system may view the data on a 9-in., 1,024-char. CRT in "normal language," Ipars Hex or reverse line Hex.

In addition, control characters may be displayed individually in either Ipars Hex or reverse line Hex, keeping the text clear and easily readable, the vendor asserted.

The unit also incorporates a 62-char. "quick brown fox" message plus line control and systems measurement instrument characters. Aside from Ipars, the system can handle standard Ascii, Ebcdic, EBCD, Selectric and Baudot formats at transmission rates in the 45 bit/sec to 256k bit/sec range, Atlantic Research said.

Intershake also incorporates Bisync, Synchronous Data Link Control and DDCMP protocols and an optional Intertape Data Recorder can selectively record 500,000 characters for later analysis, the vendor stated.

Depending on options, Intershake with the ability to handle Ipars costs from $13,000 to $20,000, Atlantic Research said from 5390 Cherokee Ave., Alexandria, Va. 22314.

Gandalf Unveils Hand-Held Tester

WHEELING, Ill. — The TTS 400 transmission test set from Gandalf Data, Inc. is a portable, hand-held device for use with both synchronous and asynchronous data communications equipment.

The TTS 400 reportedly includes a data generator and receiver/error detector combined in a single unit. The test set operates in asynchronous modes of 300-, 1800-, 4,800- and 9,600 bit/sec and in synchronous modes up to 56K bit/sec.

Additional features include constant or controlled carrier operation, built in self-test capability and an RS-232C interface, Gandalf said.

The TTS 400 costs $785 from Gandalf Data at 1019 S. Noel Ave., Wheeling, Ill. 60090.

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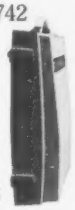
The 743 offers fast, reliable printing with a real price advantage. And the 745 is portable, weighing just 13 pounds. The 763 has built-in nonvolatile bubble memory that allows it to remember, even when the power is off. And if you need to take your data with you wherever you go, the 765 Portable Bubble Memory Terminal is ready, willing and able to allow you to enter it in common English terms, store it, then edit it at your convenience.



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Security Seminar Set

KINGSTON, N.Y. — Recently developed techniques for safeguarding communications networks through encryption for such applications as electronic funds transfer (EFT) will be discussed by two pioneers in cryptographic technology at a seminar in New York City Jan. 29-31.

Dr. Carl H. Meyer of IBM and Prof. Ronald L. Rivest of MIT will discuss "state-of-the-art techniques that can protect transmitted and stored data, authenticate system users and messages and generate electronic digital signatures," according to a spokesman from Meyer Associates, sponsor of the event. Meyer collaborated in the development of the encryption algorithm adopted as the federal Data Encryption Standard, while Rivest is an originator of public key cryptography — a technique that purportedly resolves certain problems in digital signature authentication.

Other topics will include cipher key management, integration of cryptography into systems, key generation and remote terminal authentication.

The seminar costs $595 and will be held at the Barbizon Plaza Hotel, 106 Central Park S., New York, N.Y. 10019.

Registration materials and further information are available from Meyer Associates at Box 223-11, Rte. 28, RD 2, Kingston, N.Y. 12401.

D.C. Area Bank Installing On-Line Teller Terminals

WASHINGTON, D.C. — National Savings and Trust Co. expects to reduce customer waiting time at teller windows and improve management control with an on-line teller terminal system installed at 13 area branches.

Each branch is served by a Bunker Ramo Corp. 90/20 minicomputer under the vendor's Banktran applications software. The branch facilities communicate with twin Burroughs Corp. B3800 mainframes, located at a central site, that are front-ended by a Periphonics Corp. communications processor and supported by in-house-developed software.

The six-month implementation period was "unusually short for a system of this size and capability," according to National Savings Project Manager John M. Larson. In the next six months, Diebold, Inc. Tabs 910 automatic teller machines will be tied to the mini at each branch, allowing customer-operated, after-hours service.

"We will also have our Bunker Ramo administrative terminals capable of on-line inquiry to our various application systems, saving even more time for our customers and our administrative staff when it is necessary to review a customer's complete bank relationship," Larson continued.

The system presently includes 110 teller terminals equipped with bank card reading devices and keypads for customer entry of personal identification numbers. According to National Savings, this equipment allows tellers to obtain a display of the account balance or to receive check-cashing approval within 10 seconds of the request.

A validation/journal printer handles deposit slips and other transaction documents and also prints a journal tape record of teach teller's activity.

These Bunker Ramo devices operate under control of the branch minicomputer, which includes a floppy disk unit able to record an entire day's transactions, Larson said.

Larson noted that National Savings tellers are pleased with the new equipment. "Formerly, they used a telephone with automatic voice response to obtain this data — a system that often caused delays because of slow response time," he explained.

They thought we bit off more than we could chew.

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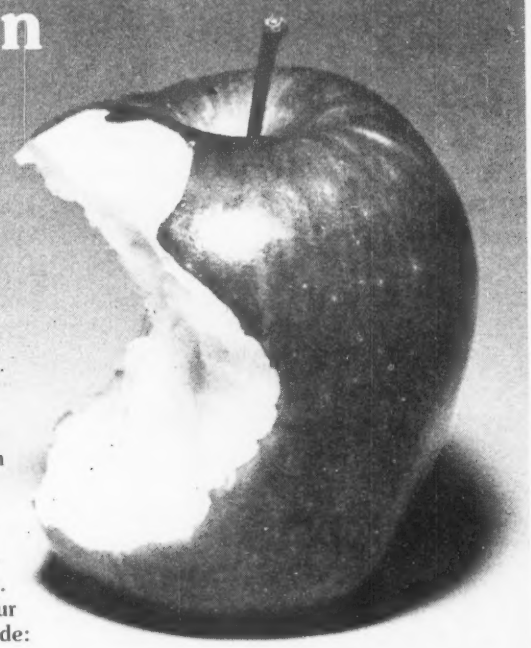

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Course to Cover Fiber Optics

ALEXANDRIA, Va. — A four-day course on fiber-optic communications systems is being planned by Integrated Computer Systems, Inc. (ICS).

"This course was designed for engineers, scientists and managers who are, or will be, involved in the planning, design and practical implementation of all types of communications systems," according to ICS.

Topics slated for discussion include fundamental concepts of fiber optic communications, optical fiber transmission, cabling technology light sources detection technology, receive and transmitter technology, modulation, data base design techniques, commercially available components and systems design and analysis.

The course was prepared by Dr. Larry Campbell, director of lightwave communications for Digital Communications Corp. and Canadian Digital Communications, Ltd. Campbell is also an associate editor of the *Journal of Fiber and Integrated Optics* and has served as an industrial consultant.

The course will be held in Washington, D.C. Feb. 27-March 2, in Dallas March 13-16, in Los Angeles April 3-6 and New York May 1-4.

The course fee is $695. Enrollment materials can be obtained from ICS at 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405 or Suite 103, 300 N. Washington St., Alexandria, Va. 22314.

Firm Puts 360s to Work in Word Processing

By Howard A. Karten
CW Staff

HARTSDALE, N.Y. — Although DPers and businesses may look back nostalgically at their old computers, those systems, unlike fine old wines, do not improve and increase in value as time goes by.

For an individual user, disposing of an aging system may not represent much of a problem. But what if a company is stuck with old IBM 360 equipment for which it paid $193 million?

DPF, Inc. (formerly Data Processing Financial & General Corp.) is attempting to solve this problem by entering the rapidly expanding word-processing market, using its IBM 360s as processors. By integrating the capacity and flexibility of the processors (which can be purchased, in some cases, for less than 2% of their original price) with word-processing software and microprogrammed terminals of its own design, the company hopes to recycle the equipment by giving word-processing users a cost-effective alternative to existing stand-alone systems.

Although the system is working well enough to permit certain private demonstrations, it has not yet been completed, nor have all the bugs been ironed out. The company intends to announce the product formally some time during the second quarter of the year.

The Word Machine, as the company is calling the system, consists of a 360, 370, 30 series or 370-compatible processor, memory, disks for handling and storing text, CRTs and output devices. Output is not limited to hard copy. Text can be sorted on microtext or in media-compatible form.

In addition, the CRT incorporates an Intel Corp. 8080-type processor that can be loaded from the host CPU.

Multifunction Device

"The down-loading capacity will make the machine terminal in itself a multifunction DP device," according to John J. Puttre, director of product development for DPF.

The combination of the microprocessor-based Word Machine terminal and the IBM system working together has been dubbed the DPF Cooperative Logic System. This term was designed to distinguish it from older shared-logic systems, such as that which IBM has announced in

(Continued on Page 60)

Only One Fit

User's 3032 Add-On Suits Needs, Space

By Jay Woodruff
CW Staff

ST. LOUIS — When IBM could not supply more than 4M bytes of the 6M bytes of memory ordered by Blue Cross Hospital Services of Missouri, Inc. for its IBM 3032, Blue Cross's DP Manager, Bill Skowyra, had to start looking for an alternative.

He found that the 7/3032 add-on memory system from Electronic Memories and Magnetics Corp. (EMM) was the only one that would fit the available space at Blue Cross' DP site. But once burned in a deal with an OEM vendor, Skowyra was skeptical about doing business with another.

"I vowed I would never deal with an OEM again," he said, referring to an experience six years earlier. Still, IBM's marketing representative could not provide shipping dates any more definite than six to eight months into the future, he said, and Blue Cross needed the memory as soon as it could find someone to supply it.

Skowyra finally agreed to get the EMM equipment when the vendor offered to let Blue Cross defer payment for the system until the organization had logged 450 hours of use.

The user handles all of the Blue Cross accounts in the St. Louis area, some Blue Shield accounts, eight hospital accounts and a few others. The various sites use 280 terminals, including 100 from Telex Computer Products, Inc. and 80 from IBM. The 30 series CPU runs IMS/VS and TSO under MVS, the DP manager said.

Space Problem

The problem with the add-on memory was exacerbated by lack of space in the computer room, he said. The IBM CPU had been installed with the expectation of getting an all-IBM memory. But when IBM delivered only 4M bytes, Skowyra found that unless the CPU was moved, the only place available for the additional 2M bytes was on the side of the CPU away from its cooling and distribution apparatus.

Although most of the memories Blue Cross considered were compatible with the CPU, the long cable needed to reach from the memory to the CPU would have caused timing interference between them. "The EMM was the only one that would go," he continued.

Its attachment cable can be lengthened, an EMM spokesman explained, because the memory incorporates random-access memory and timing boards that can be adjusted to meet the speed of the mainframe. He added that the RAM was made fast enough to match the internal speed of the IBM 30 series. The same RAM is used in memories made for all three models.

Blue Cross needed the memory fast, and EMM delivered it in 15 days, in the second week of October. EMM had requested 36 hours for setup, but the memory was checked out and running in 14 hours, the DP manager said.

EMM sent its head engineer,

(Continued on Page 56)

'Practical' Data Entry Subject of MIC Seminar

CHERRY HILL, N.J. — Management Information Corp. (MIC) is sponsoring a three-day, "interactive" seminar discussing the practical aspects of data entry.

The seminar will include instruction in data entry system concepts, organization of the data entry department, control techniques, personnel communications and motivation and operator ratings and training. The course is suggested for data entry managers, supervisors, lead operators, DP managers and data entry technical support personnel.

The meeting will be held at the Cherry Hill Inn here on Jan. 22-24, April 2-4 and June 18-20. Registration is $415 for subscribers to MIC publications and $455 for nonsubscribers, the company said from 140 Barclay Center, Cherry Hill, N.J. 08034.

USE Sets Spring Meeting

BLADENSBURG, Md. — USE, Inc., the common-interest group for users of large-scale Univac equipment, will hold its annual spring conference at the Town and Country Hotel in San Diego, Calif., March 5-9.

Cmdr. Grace Hopper of the U.S. Navy, keynote speaker, will discuss "Possible Futures — Hardware, Software and People." Also featured as speaker at a special session will be Univac's Dr. George Champine, who will discuss "Computer Technology: Impact on Users."

Further information is available from USE, Inc., which can be reached through P.O. Box 461, Bladensburg, Md. 20710.

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Offers Home Study Programs

UK University Born, Growing Up With DP

MILTON KEYNES, England — Most of the world's educational institutions predate the computer age, and as a result, computer use has been incorporated into the existing operations of these colleges and universities. However, computers have been an integral part of a unique British university that began operation in 1971. In fact, the entire operation of the Open University is built around its DP setup.

The university is made up of regional offices in London, Oxford, Edinburgh and other major cities in the UK, and its students study in their own homes. From 24,000 students in 1971, the system has grown to more than 60,000 today, and 21,000 have received degrees.

The first task the computer took on, logically enough, was the admission system. A 458K-word Univac 1100/21 processes all applications, monitoring the entire process from application to acceptance or rejection of the student. An algorithm controls allocation of places, weighing factors such as queuing order, the applicant's location and occupation and course of study. This helps the university obtain a regional and occupational balance in its student body, a spokesman noted.

The system also prepares labels which are sent to the university's mechanized mailing warehouse, located near the administrative center. These are used to send students materials pertinent to the courses they have selected. An average of 12,500 packages are mailed daily.

Grading Process

The system is also used to grade student assignments, notify the student of his grades and class standing and keep cumulative student records, including marks assigned by tutors.

The system informs the student, as well as his tutor, of progress throughout the student's tenure and makes note of grading that is overly lenient or overly harsh, according to the spokesman.

One of the principal reasons for selecting the Univac equipment, according to Bruce McDowell, DP manager for the university, was the availability of the Data Management System 1100 (DMS 1100) and communications software. "We currently have one system for tutorial staff administration, and we are in the process of redeveloping all our other systems to make a corporate data base to run on the DMS 1100," McDowell noted.

Impressive Record

The system's performance has been impressive, McDowell noted, with an average uptime record of 99%. About 70% of the system's time is devoted to student applications, 20% to development of applications and 10% to financial systems, he noted. About 1,200 programs are used by the university.

These financial applications, although only a small percentage of the total amount of work the system does, are important for the financial management of the university.

The terminals too are an important aspect of the system. Some are used by a survey team to evaluate the effectiveness of the university's teaching procedures, and others are used to give authorized research workers access to the system to review student records. The school is very much aware of the need for information privacy, so only those persons with a "real need to know" have access to the data. The terminal system replaced another that used printed reports and batch runs and now enables regional offices to access the centrally located data.

The university's DP staff designed the system to meet four key criteria, McDowell noted. It had to meet changing policy requirements, be flexible for improved handling of "special cases" within the system, provide fast response and provide authorized users with direct interaction with the system.

"We feel we have made good progress towards accomplishment of these goals. Moreover, we are obtaining a high degree of integration with intensive use of a few large files, and we are very conscious of the fact that our computer-based support systems should play a crucial role in attaining the university's objectives," he said.

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User Finds Suitable 3032 Add-On

(Continued from Page 55)

marketing specialists, sales representatives and others to the installation, Skowyra said, because this was the company's first delivery of the 3032 memory. "It was very important to them," he recalled, adding that the installation was accomplished more quickly than he expected.

The 7/3032 was working properly, according to the DP manager, but when diagnostic tests were run on the CPU, the EMM would not show up on the IBM's display of the entire working system. "The IBM system didn't recognize the EMM's existence," he said. EMM engineers were finally able to make the IBM "see" the EMM the day after the installation was completed.

'Fingerpointing' Incident

Relations between IBM and EMM personnel were cordial, Skowyra stated, but when the system malfunctioned a week after the EMM memory was installed, some "fingerpointing" took place. "Neither IBM nor EMM could find the defect," he said, "and IBM suggested that EMM's memory was the cause."

EMM thought its memory was working properly but the company decided to "dial it off" the system, Skowyra said, to see if the problem persisted on the IBM equipment. When an EMM engineer tried to run some tests on the disconnected memory, the IBM tape drive destroyed the only diagnostic tape the engineer had brought from company headquarters in California.

"It was embarrassing for the engineer," Skowyra said, "because he wanted to prove the EMM was not at fault, and the machine ate his tape."

Another tape was flown in from California, but in the meantime, it was found that IBM's equipment was the cause of the malfunction. A combination of loose cable in a 3036 console and "director problems" which the DP manager said "everybody has had," made the malfunction difficult to diagnose, leading the IBM engineers to suspect the EMM, Skowyra recalled.

Although the problem was not serious, "it was a major issue for the two companies," he added

Preventive maintenance is performed once a month, the DP manager said, adding that the memory has worked well so far.

More Memory

In fact, Blue Cross has been so satisfied with the add-on and with the vendor's attention to the organization's needs that it may order an additional 2M bytes of memory. "IBM says 6M bytes is the limit for the 3032, but everybody knows it says that because it can't deliver enough," Skowyra declared, adding that EMM and others can modify the CPU slightly to put more memory in.

EMM, he said, has again offered to supply memory on a conditional basis. In this case, the memory can be returned if the addition does not decrease response time.

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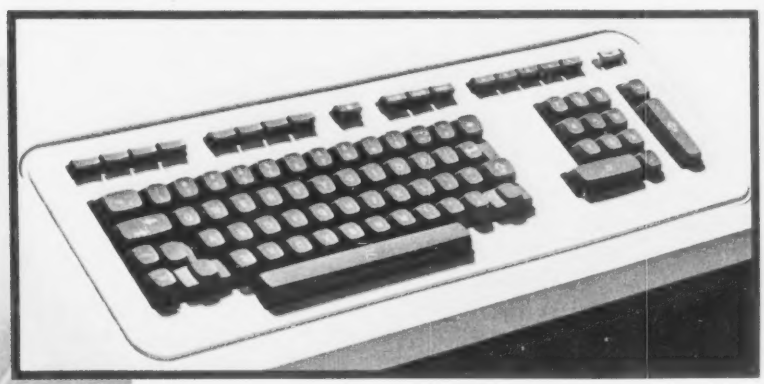

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Firm Finds Job for 360s in Word Processing

(Continued from Page 55)

its 3791 system or the completely stand-alone logic systems supplied by AM International (formerly Addressograph-Multigraph Corp.), Puttre explained.

DPF believes the system could be the first step in revolutionizing office environments. The terminal could replace an office typewriter, and the result, according to DPF officials and other observers, could affect virtually all aspects of office paper handling. To begin with, two of these areas are costs and document retrieval.

For example, the cost of preparing and sending a single letter is estimated by some management consultants to be about $5. In addition, the costs of photocopying and filing letters must be taken into account.

Puttre estimates the cost of a secretary's time at about $7/hour (assuming a salary of $14,350 and fringe benefits).

By this reckoning, 12 minutes of the secretary's time is $1.38; an average of 2.8 cents per copy adds 17 cents to that figure, assuming an average of six copies of a letter or memo. (This is probably a conservative estimate, since some oil companies make as many as 14 copies of every document they prepare, he commented.)

By contrast, Puttre said, the facilities offered by the Word Machine would significantly cut this cost, while simultaneously easing the burden of retrieval and increasing the facilities available to the business user. Since the terminal would be connected to the company's mainframe, it could be used for retrieving other information such as sales figures.

Text-Editing Facilities

The system's text-editing facilities would ease text preparation. Standard-format letters could be stored in the system with specific information plugged in as necessary. Corrections to documents could be made more easily, since the use of a CRT eliminates the need for erasing and other corrections, and global text-editing facilities could probably reduce the number of keystrokes required, he said.

The benefits to the user only begin with the preparation of the document, DPF officials believe. After a document is prepared, it could either be automatically archived or routed to an output device. This device could be a central printing facility, a typewriter-like device in an office location (at the same place where the document is entered into the system) or a computer output microfilm (COM) device. The hard-copy devices could print additional copies of a document virtually cost-free, while the COM unit could provide safe, permanent, low-cost storage.

An important part of the concept is the ability to automatically extract nontrivial words in the text. This means that in addition to filing a document on the system like any other file, under a specific name, the words used in the document could be cross-indexed. In this manner, all documents dealing with a particular matter could be retrieved automatically, Puttre said.

Boolean logic could be used to retrieve more specific documents — e.g., all documents discussing the XYZ Co. written during March.

Automatic Filing

"The major part of the system is the concept of automatic filing," Puttre claimed.

This automated document filing and retrieval could have interesting ramifications for a company's operations, he believes. For example, a corporate officer in one location could use the system to retrieve all memos written by anyone else at any location tied into the system.

Although it has not yet been announced, the DPF Cooperative Logic System has reportedly aroused the interest of several major users, including Eastman Kodak Co. and an unnamed government department which is reportedly beta-testing the system.

At present DPF estimates that for $220,000, it could supply the following configuration: 10 CRTs incorporating the 8080-type device, 500K of memory, a 600 line/min printer, eight 30M-byte disk drives, five Diablo daisywheel printers, software, a custom-built controller and a 360.

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Label System Upgraded

DAYTON, Ohio — The Standard Register Co. has upgraded its Label Preparation System with a standard flexible diskette. The enhanced system was designed for a variety of users, including warehousers and shippers.

The Series 3000 uses the flexible diskettes and a CRT to produce labels with either large characters or bar codes. These can be printed in sizes varying from .1- to 2 in. or more in height, according to a spokesman.

One or more printers with speeds ranging from 60- to 600 line/min. can be interfaced to the system. Three input options — the CRT, the diskette or an on-line host system — are available on the unit, which is being delivered now.

Prices range from $15,000 to $30,000. The company can be reached at P.O. Box 1167, Dayton, Ohio 45401.

Ten-Year Project

Hungarian Vehicle Maker Builds Real-Time Production System

By Ivan Berenyi
Special to CW

BUDAPEST, Hungary — Daily production control runs and real-time access to a data base of more than 100,000 distinct items have been achieved by the Hungarian Railways Carriage and Machine Works — Raba for short — at the culmination of a 10-year project.

The system is based on an IBM 360/40 which was installed in 1972 and which provides a 15- to 20-hour advance job-scheduling service. Data is captured on IBM CRT terminals located throughout the shopfloor and warehouses.

The system stores data for 1,800 parts for a single motor, 10,000 to 15,000 components used in railway rolling stock, 30,000-plus stock item numbers and 70,000 distinct production functions related to Raba's annual production of rail cars, diesel engines, farm machinery and commercial vehicle transmission systems.

The system provides on-demand status reports on each stock item, reporting any divergence from preset stock replenishment levels, and generates an overall daily production schedule, a tooling program for the following day and a material shortages forecast.

Daily Report

Daily printouts of production achieved and of wastage are provided at the end of the day shift.

"Instant input ensures that our stock list is always up to date, while the availability of production status on demand means we can ensure continuous production and eliminate peaks and troughs," according to Raba's DP manager, Tamas Biborka, who developed the system jointly with Systems Department Chief Sandor Sipos.

"Today, when an order is received, we can make the necessary adjustments to our planning within a fortnight, whereas previously it could take up to three months," Biborka said.

The company is believed to be preparing to place an order for a very large and new IBM mainframe in the near future.

Packet Describes Benefits of Halon

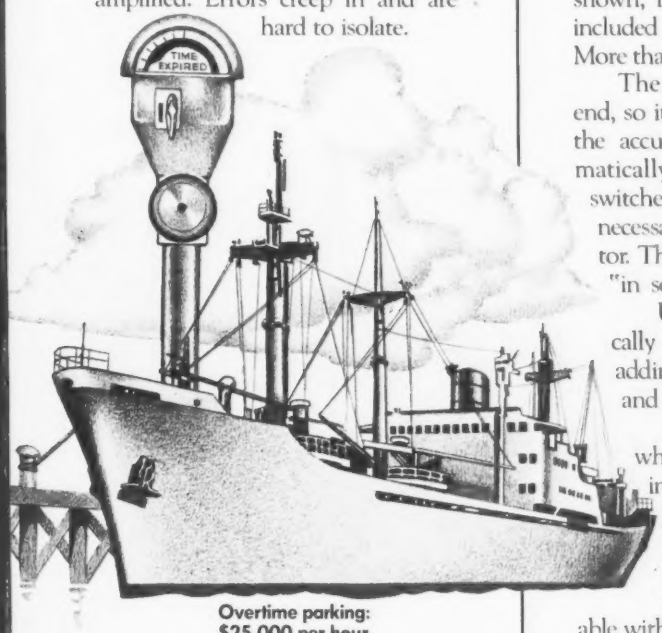
WILMINGTON, Del. — A free packet of literature available from E.I. du Pont de Nemours & Co. details the benefits and safety of the firm's widely used Halon 1301 fire extinguisher.

Two bulletins are included with information on application areas, installations and safety testing.

Requests for the packet can be sent to the company at Room 36236, Wilmington, Del. 19898.

PROBLEM:

Transferring large amounts of data from one business machine to another—an everyday business need—can be complicated, slow and costly. Signals get converted and amplified. Errors creep in and are hard to isolate.



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Whole blocks of data are jeopardized. And retransmissions eat up valuable computer and line time.

Delays can have very expensive consequences. On the order of $1,000 per hour per circuit for time-sharing firms. Twenty-five times that for a company with a ship held in port by faulty documentation. Ulcers for a data processing manager transmitting month-end reports to the home office.

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The service is digital end-to-end, so it requires no modems, and the accuracy rate is 99.5%. Automatically monitored, it instantly switches to standby facilities when necessary. Availability is a key factor. The system is designed to be "in service" 99.96% of the time.

Users often realize dramatically improved response times, adding capacity to their systems and improving efficiency.

Applications cover the whole range of business needs in point-to-point and multipoint service. In a polling environment, this service can cut access time at each terminal to half that available with alternatives.

Four data transmission speeds are available: 2.4, 4.8, 9.6 and 56 kbps. Installation can be as simple as unplugging a modem and plugging in a Data Service Unit.

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THE NEW SOFTWARE ECONOMICS
PART 2

By Werner L. Frank

IN DEPTH
IN DEPTH
IN DEPTH
IN DEPTH

Software for sale is the best bargain in town, according to Werner L. Frank. The executive vice-president of Informatics, Inc. began exploring that thesis last week by surveying the software life cycle and the productivity issue. This week, in the second part of a four-part series, Frank discusses the status of the software products industry, identifies successful software products and probes the criteria which must be satisfied for success.

Users have an overwhelming desire to minimize the risks in software development and increase the productivity of the software practitioner. Since software is both a process and a product, the question of productivity must be related to the activity of developing software, as well as to the activity of operating the software. The productivity issue, therefore, enters into both aspects of software.

With respect to software development, productivity issues relate to software project performance and the development cycles which are typically unpredictable, leading to manpower and machine utilization overruns as well as tardiness in achieving project completion. Further adding to this problem of project performance is the fundamental question of whether software meets the user's expectations, both by functionally achieving what is desired and by meeting the necessary performance, or throughput, level. All of these problems are, of course, exacerbated by the continual switches to better and faster hardware which accentuate every difficulty encountered with software.

But even when software operates acceptably, the problems are not behind us. Productivity enters into the operation of the software because there is a constant demand for changes and enhancements, as well as simple maintenance activities for the correction of defects and adaptation to a changing hardware and systems environment.

The tendency is to look to technology for the answer. Unfortunately, this will not really provide much of a salvation in the foreseeable future because improved languages, new organizational techniques and better performing hardware simply will not yield the productivity increases we would like to achieve.

The issue of software productivity is often met in the current literature by diametrically opposed ideas. The salvation for the decade of the 1980s is held to be either the development of supersoftware in the form of high-level application generators or the development of hard-wired code, or "firmware," as it is sometimes labeled.

The application generator is another attempt to reach the elusive "automatic programming" and "implicitly programmed" systems promised in the early '60s. It is unlikely that this panacea can materialize before the late '80s, if at all.

But we are in the midst of the chip revolution and software is expected to be replaced by wired-program machines, as well as by computers having read-only memories (ROM) containing microcode. These fourth-generation approaches, however, are actually hardware advances rather than software solutions.

Often the term "firmware" refers to both of these quite different approaches to incorporating into hardware what earlier was left to software. There is, however, a distinction. More correctly, the term refers to computer programs that are stored in a control memory, typically a ROM. In many cases, this control memory can be modified by privileged instructions or special machine states, permitting the replacement of such microprograms by new and different code.

The capability of highly specialized code to operate in a control memory provides the means for the object machine state to maximize its performance against certain prespecified application or system requirements. The technique is useful since it is more difficult to change the hard-wired logic of a computer than it is to recode microprograms.

In any event, the motivation is to gain more hardware capability and processing capacity than would be possible by simply using operating programs in the standard machine instruction and system repertoire.

An excellent example of how such a facility could improve performance in a given system is to contrast the microcoding of a terminal's screen image extract module with the writing of the same program in native machine code. The latter code may take an order of magnitude longer to process.

Another example is the performance improvement achievable on IBM 370 mainframes operating in the VM environment and relying on the microcoded features of VM Assist and External Control Program Support. Throughput improvements of 20% to 30% are being claimed.

This movement toward firmware, while potentially improving performance significantly, does very little to meet the fundamental needs of software design, production and maintenance. One might just as well build an entirely new CPU with improved performance, as Amdahl Corp. did with its V series.

Others would have us believe that committing the software to hard-wire is yet another scheme which can lift burdens from software practitioners' shoulders and ease the problem of productivity. For example, *Computerworld* quoted R. Heikes of Motorola as saying that "the semiconductor manufacturers will begin putting software on silicon chips instead of allowing it to be developed under the present methods" [CW, June 12]. Heikes forecast that whereas a line of code may cost $10 today to develop, that cost could drop to 5 cents a line by 1990 with this technology. However, it is far from clear

(Continued on In Depth/3)

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THE NEW SOFTWARE ECONOMICS

IN DEPTH

(Continued from In Depth/1)
how these hypothetical chips would be specified and designed.

A second position appeared in the June 8 issue of *Minicomputer News*. P. Zinsli of Pertec Computer Corp. stated that "future small computers will trim software costs since custom software will be built into the computer as firmware." But what can be committed to such hard-wire?

We have already seen the disadvantage of fixed logic in the discussion on firmware and the argument that flexibility was sought by varying the microcode in the control memory. In the case of hard-wired logic, we are back to Square One — we have only one crack and then we are committed!

It is true, of course, that with today's enormous economy of scale in chip production, one can be permitted the luxury of making many mistakes, burning in the software and then being able to replace a throwaway chip module. But what kind of software can be a candidate for such hard-wiring? More than likely it is the very same software that is a candidate for firmware, except that it probably needs to be even more standard and unchanging.

There is an additional interesting aspect of this new software microcosm. Software implemented using wired approaches, especially in microprocessors, will probably be for applications not now in existence — unlikely future candidates for the bigger minicomputer or mainframe systems.

Based on these observations, we forecast the coalescing of these two different approaches into a single approach based on the economical and successful large-scale integrated (LSI) chip technology of today. Thus we are led back to a specific machine design, admittedly somewhat more flexible and with a richer repertoire of capability.

But we are back where we started in building software, given the capability of a hardware device, the specifications of an application and the need to implement via software.

In the world of inexpensive chips, there will be some new problems which deserve identification because they may offset all the expected gains. This includes the maintenance of thousands of in-place chips, as well as the ever-present changes that applications typically demand. Will a single detected error immediately require a replacement chip from the manufacturer? Will the mails be flooded with a barrage of chips traveling in every direction?

There is another and possibly negative impact on the user with respect to systems that depend upon firmware, an impact which is unrelated to performance improvement. Firmware under the control of a manufacturer can pull into nonaccessible areas of the computer certain features and capabilities that limit the user and the independent software product supplier from fully exploiting the hardware system.

This problem is similar to the one faced by plug-compatible peripheral manufacturers, whose destiny was damaged when IBM pulled some of the operational capability and functions related to peripherals into the control boxes and the computer itself. This action could also adversely affect the rising number of CPU-compatible vendors vying for part of the IBM mainframe business.

In summary then, it is difficult to understand how replaceable microcode stored in a ROM increases software productivity by itself. The wired program is simply a means of manufacturing the turnkey system and does not eliminate the initial software production worries on the part of the designer. Software turned firmware or hard-wired still depends upon the design, specification and debugging techniques present in more conventional DP systems, as so ably pointed out in last June's issue of the Institute of Electrical and Electronics Engineers' *Computer*, which reported on problems in microcomputer software developments.

The typical implementer of a microprocessor-based system will repeat the software building process that the mainframers went through in the early 1960s. Thus, for example, we can fully expect specialized operations, such as floating-point math packages, to be replicated by user after user.

This would bring us full cycle to the point which led in the early '60s to the evolution of software products for

(Continued on In Depth/4)

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IN DEPTH

(Continued from In Depth/3)

mainframes. Now we can expect software products to become available in hard-wire as well.

Operational Considerations

In order to improve the situation with respect to productivity, we cannot rely on hardware. It is absolutely essential to pinpoint and analyze critical operational activities. There are three obvious areas of potential pay-off when the question of productivity is explored:

- *Faster realization of operational codes.* The faster one moves from a requirement or concept to an operational state, the fewer manpower and computer resources are expended.

While moving fast could be mistaken for "cutting corners," this is not the intent. Moving fast simply means that one uses the highest level of programming capability in the most specific application environment.

In other words, one should trade computer operating efficiency and generality of scope for more gross operating performance and narrower but specific requirements. This concept has been called by Kendall "install it now, program it later."

- *Minimized maintenance.* Since the maintenance activity occupies such a very large percentage of the total expenditure in support of software, it behooves users to very carefully identify the source of software defects (i.e., design!) in order to minimize their impact on the maintenance task.
- *Software selectivity.* Clearly, not every computer program has equal value in a user environment, either from the point of its performance or its relevance. It goes without saying that productivity increases should not necessarily be sought across the board for every software task, but rather on a highly selective basis as a fuction of the type of usage an organization might give to the software it owns.

Each of these three major productivity-related aspects deserves separate consideration. For any one organization, some combination of attention and remedy is appropriate in achieving higher quality and better operating software.

Software Products

It should be obvious that all three of the above problems are met by software offered as a product. Software products are the best approach to achieving productivity improvements at this time.

Software products enhance users' productivity in two independent ways. First, the product provides a development or support aid, making the application implementation task easier. For example, J. Bennet of Applied Data Research, Inc. (ADR) cited results of an ADR user survey showing the average productivity increase for four of its products in each of four categories of software production. These results are given in Figure 1 and vary from a low of 17% to a high of 103% improvement. Users of the Informatics, Inc. Mark IV system similarly reported implementation improvement over using Cobol by a factor of 6.

The second major contribution of the software product is in the availability of the application itself. Here one can achieve several objectives besides much lower costs:

- A reasonable solution to what may be required without the time consumption of a study and specification effort.
- A way to be in operation in a much shorter time and, hence, achieve the desired benefits of automation earlier.
- The ability to control the schedule and financial risks.

Status of the Industry

Software is available today in a wide variety of forms, from many sources and under various terms. It is possible to acquire readymade software for almost every conceivable computing function, including implementation aids (languages, debuggers); utilities (library handlers, sorts); environmental systems (teleprocessing, data base management systems); operational tools (measurement, scheduling); support systems (training, testing); application programs (payroll, general ledger); and industry systems (insurance administration, production control).

Furthermore, software can be purchased to operate on large computers as well as small ones. Sometimes it may actually be equivalent — for example, a language compiler, such as Basic, operating on a mainframe, mini-

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computer or microcomputer.

Within such overwhelming ranges of offerings, one can obtain simple applications (e.g., recipe conversion on microprocessors) for $4.95 or sophisticated total systems (such as a life insurance administration system) for $500,000, with an incredible price difference of five orders of magnitude.

Software is available from either the hardware manufacturer or from independent organizations which sell directly to users, as well as on an OEM basis to turnkey suppliers. There are software middlemen who, in effect, broker the products of others, as well as individual software entrepreneurs who may operate a mail-order business.

Industry subsectors have been established in which organizations make a living from the software products industry by providing catalogs of available software, consulting to users on how to buy software and, now, even advising individuals and businesses how to package and market their own software.

Software can be purchased or leased. It can be obtained in source code or restricted to object code. It may be available through the mail, on a trial basis, acquired on the basis of benchmarks or purchased on standard cassettes. Software is even available in publication form through program listings printed in popular computer hobby magazines or as an algorithm in the *Communications of the ACM*.

In the early '60s, it was not at all so. Software was openly disseminated at no cost. However, this is no longer true. In return for a price, the seller provides a property well worth purchasing. The price will reflect a range of possible terms — from a product sold "as is and unsupported" to a warranteed and maintained product with appropriate documentation, training and continued product evolution.

The independent software products industry is a sector of the computer services industry which also includes professional services and data services. It accounts for approximately 17% of the total DP expenditures in the U.S. today. Market forecasts by International Data Corp. (IDC) and Input placed the size of this independent software product business at more than $.5 billion in 1977 and forecast this business will be at the $2 billion level in the early 1980s.

Companies in this industry sector are typically small (80% with sales of less than $5 million per annum and with fewer than 100 employees) to medium size ($5 million to $15 million). There are only a few companies that count their software product sales in the $20 million-and-up level as, for example, Cincom Systems, Inc. and Informatics. Generally these organizations offer one or two major products.

The manufacturers also supply proprietary software. While such sales are not clearly identified, various efforts have been expended to estimate the IBM software revenues. In the study by Kidder, Peabody & Co., Inc. cited last week, IBM software revenues were estimated to be $400 million to $600 million per annum.

When compared with total expenditures, the product business is still a small element of the DP world, representing approximately 2% of 1978 DP expenditures. This observation is further substantiated by the purchase pattern revealed in a recent *Datamation* survey of mini and micro users, whose spending breakdown for minicomputers in 1977 was:

Hardware	83.4%
Software	11.9%
Maintenance	4.7%

Not all of this software, however, can be characterized as a product.

Another statistic is derived from Datapro Research Corp.'s annual survey in which users rate proprietary software. For 3,000 reporting installations, the average individual spending for purchased software is estimated to be:

1976	$13,928
1977	$16,224
1978	$19,780

The trend is certainly an upward one, but the absolute amount is still small relative to the total budget of typical DP shops.

While the amount may not be terribly impressive with respect to total expenditures, the growth rate and influence of proprietary software is on a much grander scale. The IBM users organization, Guide, has surveyed its member installations since 1975 to identify utilization of "non-IBM generalized teleprocessing systems, program development systems, file information systems and/or simulation systems." Response to this question (one of 111) is summarized in Figure 2.

The key data concerns the total number of "widely used" installed products, which number 49. The average number of installations of these products is 61, 72, and 82, respectively, for each of the three years. The number of "narrowly used" products is 200, or slightly more than two installations per product.

Of particular note are the performances of Panvalet and The Librarian,

(Continued on In Depth/6)

Results of User Productivity Survey *
Average Percentage Increase

	Preprocessor Systems Metacobol	On-Line Programming Systems Roscoe	Source Program Control Systems The Librarian	Automated Documentation Systems Autoflow II
Programmer Performance	86%	103%	28%	25%
Maintenance and Enhancement	26%	76%	51%	22%
Production Environment	33%	50%	31%	24%
Human Interface/-Communications	17%	62%	37%	30%

* Data from an Applied Data Research, Inc. User Survey

Figure 1

GUIDE QUESTIONNAIRE RESULTS
Installed Non-IBM Software Products

	1975	1976	1977
Number of Installations			
Total Reporting	1,104	1,003	1,013
Number Using Some Products	992	959	960
Number Using No Products	112	44	53
Cumulative Installed Products			
Widely Used	2,995	3,507	4,030
Little Used	463	382	491
Total	3,458	3,889	4,521
Average Widely Used/-Using Installations	3.0	3.7	4.2
Individual Product Statistics			
Highest Sustained Count			
Panvalet	352	371	356
Librarian	286	305	332
Fastest Growth			
Fast Dump Restore	8	224	415
Syncsort	0	200	292

Figure 2

(Continued from In Depth/5)
representing the highest sustained installation count for each product, and the very impressive introduction and acceptance of Fast Dump Restore and Syncsort, each of which has reached substantial penetration in a very short period of time.

We turn to another source showing software product impact. The most recent compendiums of product listings published in 1978 by International Computer Programs, Inc. (ICP) now counts more than 1,000 company suppliers and more than 6,000 products listed in two separate publications, one devoted to mainframes (more than 4,000 products) and the second to minicomputers (more than 2,000 products).

These publications also include 800 IBM products which make up the following percentages of the total:

Mainframe	
System	21%
Application	8%
Minicomputer	
System	13%
Application	10%

IBM SOFTWARE OFFERINGS *

Category	Number Of Programs	PERPETUAL LICENSE Number	PERPETUAL LICENSE Monthly Aggregate Fee	PURCHASABLE Number	PURCHASABLE Monthly Aggregate Fee
Generalized Application	168	82	$20,400	86	$32,900
Industry Application	192	64	$44,100	128	$100,200
Industry Systems Support	27	11	$8,100	16	$6,300
Systems Support	89	32	$15,400	57	$14,100
Productivity Aids	114	24	$5,900	90	$20,500
Data Base/Data Communications	65	43	$18,800	22	$9,000
Conversion Aids	32	2	$300	30	$32,900
Language/-Sorts/Utilities	96	52	$11,600	44	$9,600
TOTALS	783	310	$124,600	473	$225,500

* IBM Publication GB21-9949-12, 12th Edition

Figure 3

IBM SOFTWARE FEE STRUCTURE *

	PERPETUAL FEE	FIXED MONTHLY PAYMENTS 1	6	12	24	60
NUMBER OF PRODUCTS	310	54	6	357	55	1
MONTHLY FEE ($)						
All Products	124,498	49,409	1,132	139,913	30,069	4,865
Average	402	915	189	392	547	4,865
Lowest	22	110	54	32	54	4,865
Highest	6,460	5,000	600	8,710	2,500	4,865
PAID-UP FEE ($)						
Lowest	Not Available	110	324	384	1,296	291,900
Highest	Not Available	5,000	3,600	104,520	60,000	291,900

*IBM Publication GB21-9949-12, 12th Edition

Figure 4

Two other commercial catalogs of software are available. One is part of the Auerbach Computer Technology Reports, consisting of two volumes devoted to system and application software. The products included are reviewed in some detail so that the user can focus his interest.

The second source is Datapro's *Directory of Software*, a listing of offerings similar to the ICP catalog. As previously cited, Datapro also publishes, in cooperation with *Datamation*, the "Annual User Ratings of Proprietary Software," a compendium of user views on commonly employed software. This evaluation of software-in-practice can be a useful measure of a vendor's offerings as perceived by the user community.

IBM also publishes software catalogs. For example, the 12th edition of Publication No. GB21-9949-12 contains a listing of all IBM 370 software available in four classes:

- Program Products.
- Field-Developed Programs.
- Installed User Programs.
- Programming Requests for Price Quotation (RPQ).

Figure 3 summarizes these programs by eight categories and provides license fee information. The products are shown according to the license option — in the first case where the monthly rental fees continues perpetually, and in the remaining cases where either a one-time payment is required or payments continue for a fixed number of months, at which time the product license is fully paid.

Figure 4 presents the IBM software data according to the fee structures from which is deduced the minimal and maximal monthly payments of $22 and $8,710, respectively, with the average of the perpetual fees at $402 per month.

We refer once more to the views of Kidder, Peabody & Co., Inc. as reported in *Computerworld*, where at least one observer's view of the importance of software products in the IBM future was noted. The analyst foresees "software products, or microcoded functions now performed by software, generating as much as 40% to 50% of the firm's revenues within the next 10 years."

While this might be an exaggeration of no small amount, it certainly underscores the importance of software.

Finally, we cite the role of the U.S. government in recognizing software as a public asset. Two major sources of publicly developed software have emerged. One is the Technology Utilization Office of the National Aeronautics and Space Administration (Nasa), which distributes more than 1,500 computer programs through its Computer Software Management and Information Center (Cosmic), operated by the University of Georgia. An indexed abstract journal, *Computer Program Abstracts*, is issued by Nasa four times a year listing Cosmic's software. Prices range from several hundred to several thousand dollars per program.

A second source is the Department of

Commerce's National Technical Information Service (NTIS), which makes available government-developed software at prices ranging from $100 to $1,000. Publications of NTIS listing such software include:

- *Directory of Computerized Data Files, Software and Related Technical Reports.* This includes more than 1,000 data banks and software programs.
- *Directory of Computer Software Applications.* This is comprised of a number of volumes, organized by major application areas containing program listings.
- *Computer Control and Information Theory.* This bulletin service lists abstracts of recently available software- and hardware-related reports and devices.

Successful Products

What better way to measure success than by numbers? Indeed, this is done yearly by one of the software product industry's best known promoters, ICP. At the March 1978 Seventh Annual ICP Million Dollar Awards Ceremony, the revenues and volume achievers were recognized; the leaders are shown in Figures 5 and 6.

Given the very small overlap implicit in these two tables, the 25 products shown in Figure 7 may be classified as highly successful:

(Continued on In Depth/10)

SUCCESSFUL SOFTWARE PRODUCTS
REVENUE ACHIEVERS *

PRODUCT	VENDOR	NUMBER OF INSTALLATIONS	CUMULATIVE REVENUE (Millions of Dollars)	REPRESENTATIVE INSTALLATION PRICE (Dollars)
The Librarian	Applied Data Research, Inc.	4,500	20	8,000
Scert	Comten, Inc.	530	20	35,000
Life-Comm	Informatics, Inc.	40	20	400,000
Insci Human Resource Systems	Information Science, Inc.	375	30	90,000
MSA Payroll System	Management Science America, Inc.	600	20	35,000
MSA General Ledger System	Management Science America, Inc.	718	20	40,000
Policy Management System	Seibles, Bruce & Company	106	20	160,000
Adabas	Software AG	302	20	132,000
Talk	System Architects, Inc.	42	20	500,000
IDMS	Cullinane Corp.	350	20	45,000
Total	Cincom Systems, Inc.	2,000	50	40,000
Mark IV Systems	Informatics, Inc.	1,300	50	42,500

* As recognized by ICP, Inc.

Figure 5

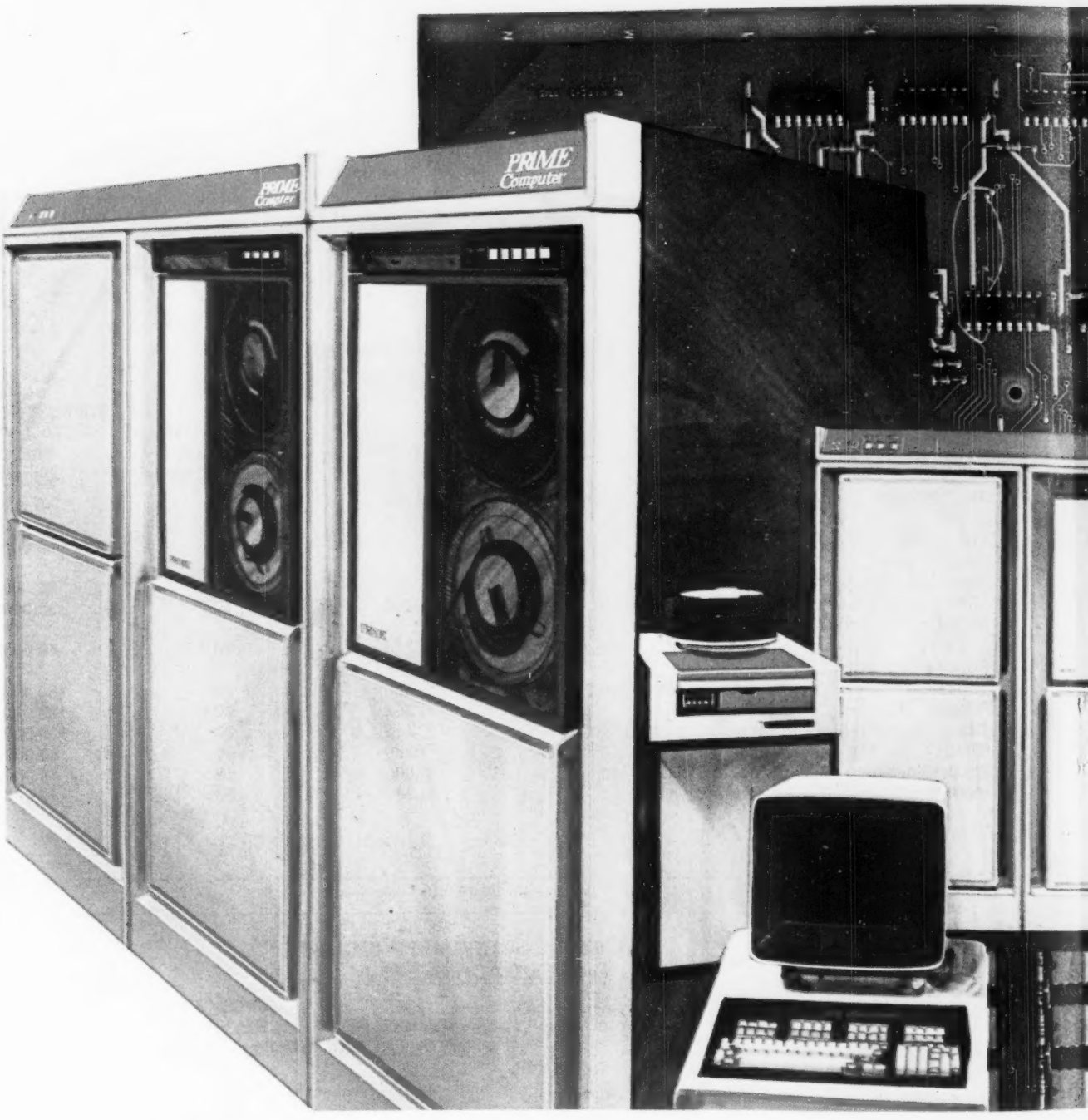
SUCCESSFUL SOFTWARE PRODUCTS
VOLUME ACHIEVERS *

PRODUCT	VENDOR	NUMBER OF INSTALLATIONS	CUMULATIVE REVENUE (Millions of Dollars)	REPRESENTATIVE INSTALLATION PRICE (Dollars)
Autotab II	Capex Corp.	1,000	1	14,450
General Ledger	Software International Corp.	1,000	10	35,000
Ramis	Mathematica, Inc.	1,000	10	34,000
Easytrieve	Pansophic Systems, Inc.	1,650	10	15,000
Mark IV	Informatics, Inc.	1,300	50	42,500
Job Accounting Report System	Johnson Systems, Inc.	1,350	5	7,000
Alltax	Management Science America, Inc.	1,600	2	2,000
Fast Dump Restore	Innovation Data Processing	2,100	5	4,000
Total	Cincom Systems, Inc.	2,000	50	40,000
Syncsort	Whitlow Computer Systems, Inc.	2,000	10	6,000
SPSS	SPSS, Inc.	2,075	2	2,500
Autoflow II	Applied Data Research, Inc.	2,100	10	7,500
CA-Sort	Computer Associates, Inc.	3,000	10	5,000
Panvalet	Pansophic Systems, Inc.	3,300	10	6,000
Westinghouse Disk Utility	Westinghouse Electric Corp.	3,522	1	2,500
The Librarian	Applied Data Research, Inc.	4,500	20	8,000

* As recognized by ICP, Inc.

Figure 6

Prime introduces four innovat



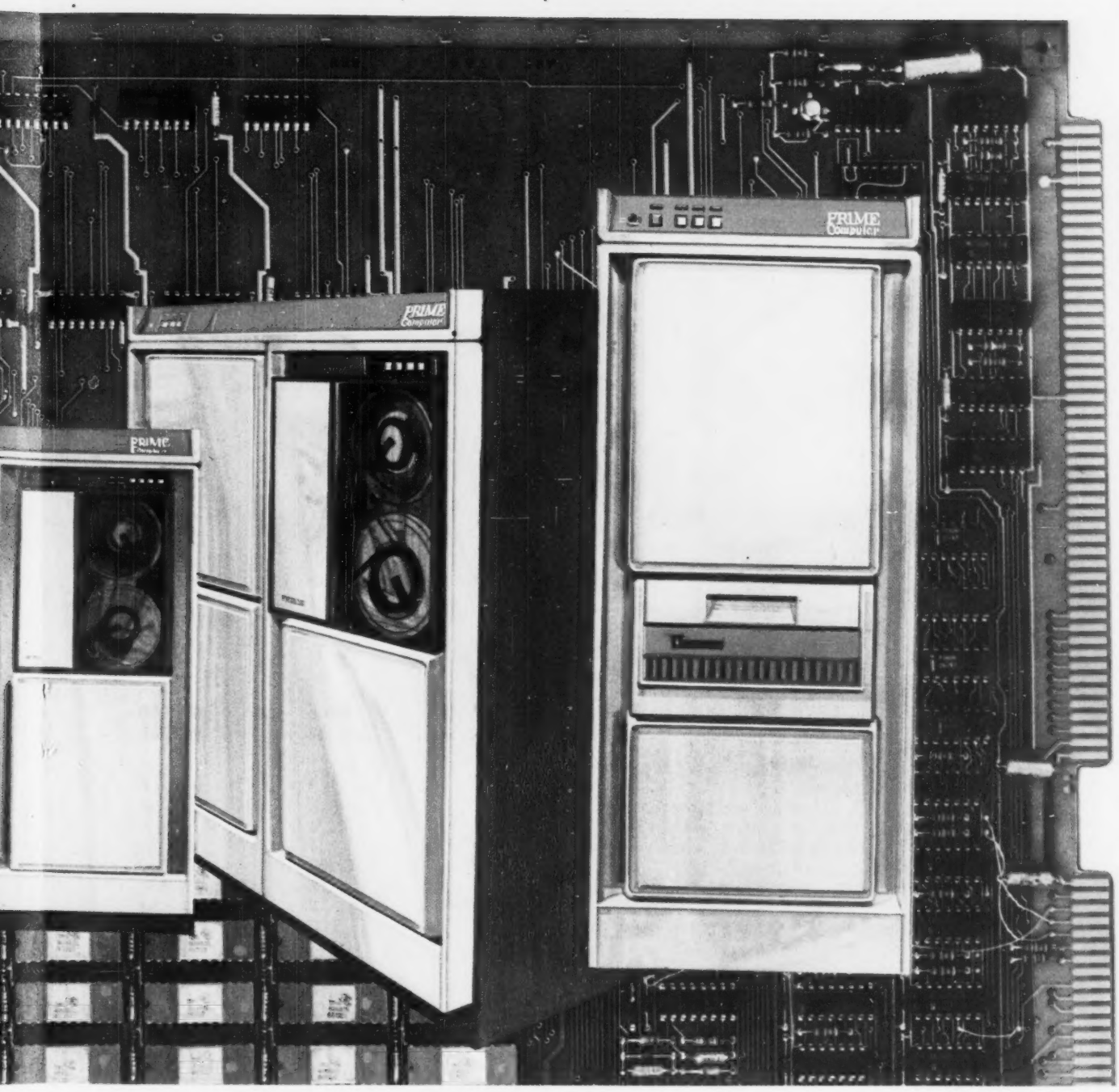
The new computers
Introducing the Prime 450, 550, 650, and 750. They provide more big-system capabilities for less money than ever before—up to five times the performance of our previous top-of-the-line system. From the 450, designed especially for builders of small business systems, to the very fast and very versatile 750, these Prime computers establish new price/performance standards for interactive, multi-user applications.

Hardware features you can use now
Our new top-end system, the Prime 750 comes with:
– full 32-bit central processor architecture,
– up to 2.4 billion bytes of disk storage,
– up to 8 million bytes of error-correcting main memory,
– 32M bytes of virtual memory per user, with up to 63 simultaneous users,
– 16K bytes of high-speed cache memory,
– 8M-bytes-per-second I/O transfer rate,
– virtual control panel.

But impressive hardware features don't mean much if you can't put them to work. Prime's unique "software first" design philosophy makes sure all the hardware features in our four new systems are anticipated by and fully utilized by our system software. You get the full benefit of these new features immediately.

Maximum software compatibility
Each of the four new systems (and every other Prime computer as well) uses the same software. A single operating system, called PRIMOS, controls every

vative new computers.

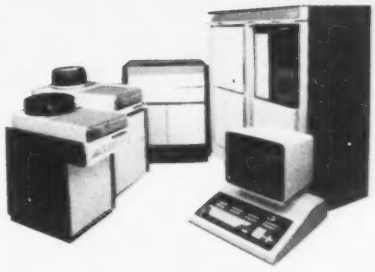


Prime system. A single file structure is shared by all Prime systems software and programming languages. A single version of each industry-standard language, including COBOL, FORTRAN, BASIC, and PL/1, is used interchangeably on every Prime computer. A single communication system called PRIMENET provides complete local and remote network facilities. And, a distributed processing terminal executive, DPTX, provides an IBM 3270-compatible interface for all Prime computers. This total upward/downward compatibility means your software investment will be fully protected as your system grows.

The Prime Computer User Plan

The new Prime systems come with something none of our competitors can match: The Prime Computer User Plan. It features the industry's first and only guaranteed processor trade-in plan. If the Prime system you start with needs more computing power, you simply trade in the central processor for a faster one. The new processor will work with your existing peripherals, and will run all your existing software without reprogramming. We guarantee it.

For more information on the four newest Prime computers, contact the Prime office nearest you, or write to us at 145 Pennsylvania Avenue, Framingham, Mass. 01701.



PRIME

Innovative computers for computer innovators.

IN DEPTH

SUCCESSFUL SOFTWARE PRODUCTS ACHIEVERS' PRICE PROFILE

AVERAGE PRICE PER INSTALLATION (Thousands of Dollars)

	Low Volume (< 1,000)	High Volume (> 1,000)
Low Revenue (< $20 Million)	— —	11
High Revenue (≥ $20 Million)	164	30

Figure 7

SUCCESSFUL SOFTWARE PRODUCTS ACHIEVERS' INSTALLATION PROFILE

NUMBER OF INSTALLATIONS

	Low Volume (< 1,000)	High Volume (> 1,000)
Low Revenue (< $20 Million)	— —	13
High Revenue (> $20 Million)	9	3

Figure 8

(Continued from In Depth/7)

- Low revenue, high volume.
- High revenue, low volume.
- High revenue, high volume.

The data requires interpretation, since some vendors include as clients those who use the product on an outside time-sharing system. Also, the cumulative revenue amount is conservative since it reflects 1977 levels recognized by ICP in stated increments of $1 million, $2 million, $5 million, $10 million, $20 million, $30 million and $50 million. Finally, the "representative" installation prices are current prices for a single commercial installation, as best known, and hence cannot be multiplied by the installation count to generate historic revenue figures.

The unit price characteristics of successful products are shown in Figure 8, where we note that the low-revenue, high-volume average installation price is $11,000; the high-revenue, low-volume amount is $164,000; and the high-revenue, high-volume average is $30,000. The overall weighted average price of these successful products, based on current prices and reported cumulative installations, is $26,000 whereas the average current price, excluding the distortion effect of the two highest priced products, is $32,000.

It must be remembered, of course, that this data reflects the cumulative performance of the industry for more than a decade, although approximately 75% of the sales has been achieved in the last five years.

Measured by numbers of installations alone, the high-volume producers (more than 1,000 installations) compare well to the second-tier manufacturers and their installation numbers for hardware models. The associated software revenues are, however, substantially below those which a hardware vendor might have achieved. Therefore, the absolute profit is substantially less in software, although the profit margin on revenue could be expected to be comparable. This will be examined subsequently.

From this data we synthesize and define what will be termed a successful software product, considering a two year development period and a five year sales cycle:

(1) Number of product installations: 500.

(2) Product revenues: $10 million.

(3) Penetration in total available market: 5%.

(4) Share of the total penetration: 20%.

We further observe that, typically, the successful product will have a sales price of $20,000 per installation and require an initial development effort of more than 10 man-years. Annual maintenance charges for such a product will range from 8% to 12% of the product value.

On this basis, the vendor of a winning product can expect to realize about 20% gross profit on revenues.

However, for every product successful by the above terms, there is at least one failure experienced at development time and two products that barely generate any profit at all. This excludes the many ideas and initial starts that never pass the conceptualization or preliminary design stage.

A DECADE OF THE MARK IV SYSTEM

CAPABILITY/FEATURES	1968	1978
Cumulative Quantity		
Revenues	$2 Million	$65 Million
Installations	50	1,300
Releases	1	20
Development Dollars	$1 Million	$10 Million
Training Classes	— —	2,000
People Trained	— —	15,000
Base Price		
Minimum System	None	$12,000
Top-of-Line System	$30,000	$42,000
Count or Number		
Models	1	6
Operating System Environments	2	15
CPU Vendors	1	7
Options/Special Features	1	25
Lines of Code	25,000	400,000
Program Modules	72	804
Overlays	8	88
Pages Documentation	200	2,000
Diagnostic Messages	284	1,217
Training Courses	5	12
Installation Parameters	1	35
Typical Host Computer	IBM 360/40	IBM 370/145
Minimum Host Computer	IBM 360/25	IBM 370/115
Maintenance Fee	None	$2,700/Year

Figure 9

Because of my relationship to the realization of Informatics' Mark IV system, the product is a natural choice to typify the proprietary software story. The Mark IV was first offered as a proprietary software product by Informatics in 1967. It was the culmination of years of thought and development by John Postley and emerged from a number of predecessor systems — Girls and the three earlier Mark systems.

Mark IV is today one of the most widely used proprietary software implementation systems. It ranks in usage as a programming language behind Assembler, Cobol, PL/T, Basic and Fortran. More than 15,000 individuals have received formal training in Mark IV usage and more than 40,000 have employed it for implementing applications.

But the real Mark IV story is best represented by the progress of the product over its lifetime. When the package was originally made available, its life was forecast at four to five years, coinciding with the life cycle of the then-prevalent IBM 360 family of computers. Since then, however, Mark IV has evolved as a family of capabilities in its own right and has enjoyed a longer life span through the continued use of the 360 computer family, the IBM 370 series and, now, because of hardware life-cycle extenders such as the Series 30 and the IBM-compatible CPUs.

In order to obtain a view of how a software product evolves, take a look at Figure 9, which shows the progress of the system over a decade of service.

After 20 releases and expenditures for development of more than $10 mil-

THE NEW SOFTWARE ECONOMICS

IN DEPTH

lion, the Mark IV system has been improved and expanded in a variety of measurable ways. Not only does it operate in more environments, but its capability and capacity has expanded by an order of magnitude as measured by lines of code, program modules, overlays, documentation, error messages and available options.

But what has not changed are the 11 basic implementation specification forms. The language externals, while enhanced, have not been compromised. Software written for the early releases will also function under the current Mark IV.

It is interesting to note that the top-of-the-line system price has increased by only 40% in a decade, during which the consumer price index, measuring the inflation rate, rose by 80%.

The combination, therefore, of the modest price increase — 50% of the inflation rate — with the increased capability of the system provides in 1978 a cost-effectiveness improvement of this software by a factor of 12 over the initial price.

Software need not be expensive, and an order of magnitude of cost effectiveness can be realized over a decade!

Issues Faced by the User

IDC stated in its *EDP Industry Report* of Feb. 28, 1978 that "staff-related expenses, the largest budget item accounting for more than 44% of the 1978 budget, are dropping steadily . . . quite possibly the popularity of software packages may be a major factor assisting the DP manager in holding personnel costs to less than 50% of his budget."

With such a persuasive view of the value of software products, it is surprising that user budgets still support outside purchases with only about 1% of their total DP expenditure. No doubt certain in-house issues still hold back users from what seems to be an obvious economic choice.

A further statistic, cited from an annual Informatics survey of more than 300 organizations in its user base, discloses that, from 1974 through 1977, there was still only a small but ever-increasing number of new applications implemented with purchased software rather than in-house development. For domestic users, the percent of new applications implemented with outside purchased software for each of the four years of the survey was 4%, 7%, 10% and 12%, respectively.

For non-U.S. users, who were surveyed beginning a year later, the percentages were 3%, 7% and 12%, respectively, indicating overseas clients are catching up with their U.S. counterparts in purchases of outside application products.

Another statistic comes from the Auerbach Publishers "Software Expenditure Survey" dated 1977 in which more than 300 companies were surveyed with respect to their in-house versus outside software expenditures. The results revealed a split in 1976 spending as follows:

	In-House	External
Application Software	80%	20%
Systems Software	40%	60%

On a composite basis, 85% of the software budget went toward in-house development and only 15% to the outside, the latter a rather small portion.

A senior officer in the Department of Defense presented the first argument I ever heard against the purchase of proprietary software. This manager said the in-house technical staff would be offended at being handed programming designed by someone else and, equally important, that such a purchase would preclude this staff from the technically challenging task of building the software itself.

Quite obviously, this argument ignored fundamental economic issues. More importantly, however, it displayed a misplaced notion of why a data processing facility and staff exists. Needless to say, the enterprise exists to solve problems for users, not to create jobs for programmers and analysts.

A related argument is the "not-invented-here" syndrome, which is equivalent to believing that each orga-

(Continued on In Depth/14)

because today, ultra-isolation isn't enough.

The ultra-isolation transformer is fast becoming obsolete. It's being replaced by SOLA'S ULTRA-REGULATION MINI AND MICRO/MINICOMPUTER REGULATORS. Sola Ultra-Regulation protects your sophisticated electronics from everything that ultra-isolation does — plus things like brownouts, transients, over-voltage, short-circuits, and *both* types of line noise. Best of all, Ultra-Regulation is yours for about what you pay for ultra-isolation.

What is ULTRA-REGULATION?

Ultra-regulation is the protection you get with Sola's Mini and Micro/Minicomputer Regulators—complete protection from every AC power problem short of total blackout. It's a "portable dedicated line" that you can plug in where you need it most, or hard-wire for permanent protection.

Why is it superior to ultra-isolation?

Because complete protection is better than partial.

Take line noise, for instance. There are two types: common mode noise and transverse mode noise. An ultra-isolation transformer will screen out common mode, but will do nothing to protect your equipment from the equally damaging effects of transverse mode noise.

Sola's Mini and Micro/Minicomputer Regulators reject both—common mode noise to 120 db *and* transverse mode noise to 60 db. Complete noise rejection.

Brownout protection is another real bonus feature. Input line voltage variations of ±15% are instantaneously regulated to a maximum output deviation of ±3%. And, the output will remain within NEMA voltage specifications of ±5% to −10% for input voltages as low as 65% of nominal.

You won't find short circuit or over-voltage protection in any ultra-isolation transformer. But Sola's Mini and Micro/Minicomputer Regulators provide automatic output current and voltage limitation.

Last but not least, the Micro/Minicomputer Regulator provides complete isolation from power line, less than 3pfd.

Add it up and you've got a lot more than ultra-isolation. You've got Ultra-Regulation. And you get it with Sola's Mini and Micro/Minicomputer Regulators.

Sola Ultra-Regulation is available off your distributor's shelf in a choice of ratings between 140 VA and 7.5 KVA. See him today, or write Sola for more information.

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The elite of communications carrier, technology, and user application world are lining up to join the Communication Networks program. Since the last "Update" and "Linkup" on Communication Networks program, the following speakers have committed to make presentations or participate in panel discussions on Communication Networks in the 1980's:

TUESDAY

Keynote — RICHARD E. WILEY, Kirkland & Ellis; Dr. DIXON R. DOLL, Pres., DMW Group; JACK R. EPSTEIN, Principal, Booz, Allen & Hamilton; ANTHONY OETTINGER, Prof. & Director of Programs on Information Policy Resources, Harvard University

Revising the Communications Act of 1934 — RICHARD E. WILEY, Kirkland & Ellis; The Hon. LIONEL VAN DEERLIN, House of Representatives; HARRY M. SHOOSHAN III, Esq., Chief Counsel, House Subcommittee on Communications; ROBERT R. BRUCE, Esq., Gen. Counsel, Federal Communications Commission; A.G.W. BIDDLE, Pres., Computer & Communications Industry; WALTER HINCHMAN, Esq.; WILLIAM G. McGOWAN, Chairman of the Board, MCI Telecommunications Corporation; WILLIAM G. SHARWELL, V. Pres., AT & T; EMANUEL FTHENAKIS, Pres., American Satellite Corp.; E.F. MURPHY, Pres., RCA Global Communications, Inc.

Network Strategy — Dr. HOWARD FRANK, Pres., Network Analysis Corp.; JOHN GANTZ, Director, SNA Acceptance Survey, Editor, Distributed Processing Reporting Service, International Data Corp.

Luncheon Address — HENRY GELLER, Esq., Asst. Sec. for Communications and Information, NTIA

Network Planning & Design — LYNN HOPEWELL, Dir. of Network Engineering Operations, Computer Sciences Corp.; ROBERT CRAIG, V. Pres., Chase Manhattan Bank; JAMES JEWETT, Prof., Grad. School of Management, Vanderbilt University

Telecommunications Management — HARRY NEWTON, Publisher, The Telecom Library; GERALD ELY, V. Pres., Merrill Lynch Company

Facsimile Network Applications — PAUL BROBST, V. Pres.-Operations, Rapicom; JIM HAWKINS, Dir. of Product Mngmnt., Graphnet; Dr. JEROME LUCAS, Sr. Scientist, Research Eng., Comsat; ED ENOCHS, Facsimile Systems Product Mngmnt., Computer Communications, Inc.

Optical Communications Technology for Networks — JEFFREY C. HECHT, Managing Editor, Laser Focus Magazine; JOHN E. FULENWIDER, Sr. Staff Consultant-Telecommunications Sciences, Arthur D. Little; Dr. IRA JACOBS, Dir., Wideband Transmission Lab., Bell Telephone Laboratories; BART BIELAWSKI, V. Pres., Sales & Marketing, Siecor Optical Cables Inc.

New Developments in Voice Network Applications — JAMES R. CARREKER, V. Pres., Product Dev., Datapoint Corp.; ROY LAYTON, Dir. of Communications, Allstate Insurance Company; WILLIAM HOOTEN, Communications Manager, Morrison Knudsen Co.; KERRY B. STEWART, Mngr./Telecommunications, Kellwood Company

Intelligent Network Switching Systems — JERRY W. FINEFROCK, Mngr., Network Management, Southern Pacific Communications Co.; MICHAEL D. BLACKWELL, Tandem Systems Marketing, AT & T

WEDNESDAY

Network Access & Interface — TOM J. MERCER, Communications Systems Consultant, Satellite Business Systems; B.H. HARCHARIK, Pres., Tymnet; RAY SANDERS, Pres., TRAN

Office Administrative Networks — HOWARD ANDERSON, Pres., The Yankee Group; JAMES DOUGHERTY, Communications Manager, Equitable Life Assurance Society

User's Voice in Telecommunications Policy — PHILIP ONSTAD, Mngr. Telecommunications Policy, Control Data Corp.; LARRY F. DARBY, Chief, Common Carrier Bureau, Federal Communications Commission; BERT C. ROBERTS, Jr., Sr. V. Pres., MCI; SEYMOUR R. ROSEN, Asst. V. Pres.-SMG, Citibank

ACS and the Future of Packet Networks — Dr. JOHN M. McQUILLAN, Mngr. Systems Analysis Dept., Bolt, Beranek & Newman, Inc.; LARRY ROBERTS, Chrmn., Telenet Communica-

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There is nothing like an open debate between deeply committed parties in an area as complicated as communication network regulation. This session, open to all conference attendees and others in the Washington area, will provide maximum exposure for the viewpoints of the different carriers, regulators and users. The following speakers have accepted our invitation to present their perspectives:

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James E. Olson, Exec. V.P.
A.T.&T.

Joseph Fogarty
FCC Commissioner

Dean Burch, Attorney
Pierson, Ball & Dowd

George Mansur, President
Aeronautical Radio, Inc.

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Leland Johnson, Assoc. Administrator for Policy
National Telecommunications & Information Administration

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tions Corp.; PETER D. MOULTON, Computer Communications Specialist, U.S. Senate Computer Center

Distributed Processing — JOHN GANTZ, Editor, Distributed Processing Reporting Service, International Data Corp.; ROBERT SANTOS, Asst. V. Pres.-Data Systems, AT & T; THEODORE HARRIS, Computer Systems Specialist, Environmental Protection Agency

Network Security and Encryption — BELDEN MENKUS, Consultant; R. BARRY ASHBY, Pres., Ashby and Associates; HERBERT BRIGHT, Pres., Computation Planning

Implementing Tomorrow's Office — Dr. JAMES H. CARLISLE, Pres., Office of the Future, Inc.; SANDFORD F. KAIT, Mngr., Corporate Information Systems, ITT; EDWARD SCOTT, Asst. Sec., Dept. of Transportation

Limited Distance Networks — GERALD MUELLER, Sr. Consultant, R.L. Dean & Associates; WILLIAM NUGENT, Dir., Automated Systems Office, Library of Congress; ED MILLBURY, V. Pres. Engineering, Gandalf Data, Inc.; GEORGE SPARK, Develcon Electronics

Trends in High Performance Network Components — ROBERT J. KAUFMAN, Mngr., Data Communications, Damon Corp.; Dr. DAVID LYON, Dir. of Research & Development, Intertel, Inc., EDWARD MILLBURY, V. Pres.-Engineering, Gandalf Data, Inc.

Using Value-Added Networks — ELY S. LURIN, Principal, Input, Inc.; LYMAN HARDEMANN, Consultant-Telecommunications, R.L. Deal & Associates; ALLAN KRONENBERG, Telecommunications Dept., Metropolitan Life Ins. Co.; JOHN ATWOOD, Dir. of Communications, Hughes Aircraft Co.

Futurist's Field Day — DRAKE LUNDELL, Editor, Computerworld; CARL HAMMER, Dir., Computer Sciences, Sperry Univac; CHARLES P. LECHT, Pres., Advanced Computer Techniques; TED MERRILL, Communications Editor, Business Week; WINSTON E. HIMSWORTH, V. Pres., Salomon Brothers

THURSDAY

Electronic Message Systems — Dr. KAS KALBA, Pres., Kalba Bowen Associates, Inc.; PHILIP S. NYBORG, V. Pres. & Gen. Cnsl., Computer & Communications Industry Association; WILLIAM VON MEISTER, Pres., Digital Broadcasting Corp.; JOHN McLAUGHLIN, Exec. Dir., Postal & Allied Arenas, Harvard Univ. Program on Information Resource Policy; WILLIAM COMBS, V. Pres., Xerox Xten Service; CARVER WASHBURN, V. Pres. of Strategic Planning, Western Union Telegraph Co.; HAROLD R. JOHNSON, V. Pres., Marketing, American Satellite Corp.

Privacy In Communication Networks — WILLIAM WEWER, Sutherland, Asbill & Brennan; JERRY LOBEL, Mngr., Computer Security & Privacy, Honeywell Information Systems; RICHARD SCHRIVER, Sr. V. Pres. Corporate Systems, Chase Manhattan Bank; JAMES HOWARD, Esq., Counsel, Natl. Telecommunications & Information Administration

Future of Communication Terminals — CHARLES CAMPBELL, Project Editor, Data Communications, Auerbach Publishers Inc.; DANIEL H. CARTER, Mngr., Strategic & Long Range Business Planning, Texas Instruments Digital Systems Group; ROBIN WHITE, Dir. of Product Planning, ADDS, Inc.; JOSEPH SIMMONS, V. Pres., Threshold Technology

International Issues and Costs — GARY AUDIN, Pres., Delphi, Inc.; JOSEPH M. KITTNER, Esq., McKenna, Wilkinson & Kittner; JAMES S. BLASZAK, Common Carrier Bureau, Federal Communications Commission; WILLIAM C. BRASUELL, Mgr. Telecommunications, Fairchild Semiconductor Co.

Network Economics — Dr. LEE L. SELWYN, Pres., Economics & Technology, Inc.; ROBERT BENNIS, Dir. of Telecommunications, Westinghouse Electric Corp.; TORRENCE W. SNYDER, Dir. Advanced Planning & Research Div., General Services Administration Automated Data & Telecommunications Service; MERRILL E. BLAU, Technical Consultant, Natl. Communications, Sears, Roebuck, & Company

Satellite Carrier Capabilities — RONALD McCABE, Mngr., Communication Analysis, Satellite Business Systems; WILLIAM BROOK, Asst. V. Pres.-Satellite Programs, Western Union Telegraph Co.; Dr. EUGENE CACCIAMINI, V. Pres.-Technical, American Satellite Corp.

International Network Carrier Trends — Dr. THOMAS MATHAI, V. Pres. Data and Facsimile Services, RCA Global Communications; MARTIN WEISBARD, Dir. Network Engineering, ITT World Communications; DONALD R. STACKHOUSE, V. Pres. Operations & Engineering, RCA Global Communications

Network Oriented Data Base Services — PAUL ZURKOWSKI, Pres., Information Industry Association; HAINES GAFNER, Pres., Link, Inc.; CHRISTOPHER BURNS, V. Pres. Planning, Washington Post Co.; ROBERT QUINN, V. Pres., Viewdata, Inc.

Teleconferencing in a Network Environment — JOSEPH R. BEICHER, Mngr., Administrative Communication, Natl. Aeronautics & Space Administration; JOHN DONOVAN, Dir. of Corporate Data Processing Support, Aetna Life & Casualty Insurance Co.; DICK SMITH, Teleconferencing Product Manager, American Satellite Corp.

Front End & Communication Processors — Dr. WALTER DICK, Coopers & Lybrand; WILBUR W. MARSHMAN, V. Pres., Computer Communications, Inc.; JACK OWENS, Technical Consultant, Coopers & Lybrand; Dr. GERALD CEDARQUIST, V. Pres.- Engineering, DCA, Inc.

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IN DEPTH

(Continued from In Depth/11)
nization has its own unique problems and capability for solving them.

Another argument against proprietary software assumes an outside software product may require new training. This situation certainly arises when a product is impiemented in a language unfamiliar or inconsistent with the client's standards. Thus, PL/I or assembler coded software usually do not go over in a Cobol shop.

Indeed, this may be a strong argument. However, since some packaged software is not delivered in source code anyway, the issue is often a red herring.

There is even a more convincing argument which should undermine this language issue. Tinkering with purchased software should be discouraged. Not only does it defeat a major purpose for the buyer of a standardized system, it may invalidate the maintenance support provided by the vendor.

There is always, of course, the issue of price. The in-house staff will often claim that the outside purchase of software can be matched by in-house development. Needless to say, the financial arguments are often incomplete and deficient because:

- They ignore total costs, that is, the personnel overhead and computer costs incurred by the development team.
- They overlook the cost of the definition and design phase, as well as the maintenance phase. In other words, only the programming implementation expense is identified with the product purchase price.

A last resistance point is the argument that the off-the-shelf software cannot possibly meet the stiff and often inflexible in-house requirements for function and capability. But little does that user realize that the last 20% of his self-imposed needs often lead to the 80% overrun on the project — a project which may never be completed or may be at least a year late. What the user may assume to be absolutely required may be perfectly adjustable when he is faced with having immediate capability at a substantial cost reduction.

Even if all of these arguments against purchasing software have some merit, it can hardly be challenged that first-time users can best be served by relying on existing, commercially available software. Such a user benefits directly from the documentation, procedures, training and support which have evolved over a broad and experienced base. With such a start, the user can, at a later optional point, redesign or restructure his application in a more customized direction — a direction based on a meaningful first experience.

For this purpose, many application software products provide user-accessible "hooks" which are strategically located to enable customized enhancements to be added through conventional procedural languages (i.e., Cobol, PL/I, etc.).

A much more interesting phenomenon, however, is on the horizon with respect to application software production. Veteran users are now facing insurmountable constraints with some of their bread-and-butter applications that have been running for 10 to 20 years. Such applications have seen the likes of the 1410, the 360 and the 370. Shades of emulation may still be underlying the code!

When the time comes to replace the old payroll, the old general ledger and the old personnel system, could any modern-day DP manager possibly commit his user organization to a redevelopment of projects which entail investments of hundreds of thousands of dollars when each of such applications can now be purchased off-the-shelf for less than one man-year of cost?

Users must look outside before touching the pencil to the coding pad. The DP organization that does not budget for a continued level of effort in "software watching," both systems and applications, has not recognized the obvious and cannot claim to be a modern, cost-conscious business entity.

The Hardware-Software Connection

As we have noted, users who feel the necessity to "do their own thing" have traditionally placed obstacles in the way of purchasing proprietary software. Most users do not date back to the early days of the Computer Age and, therefore, do not know that many

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organizations built their own hardware for many of the same reasons that some users are today creating their own software. But this early need for localized hardware innovation passed rapidly, even within the universities, where research and development is a recognized part of the activity rather than a parochial indulgence.

Perhaps the fast pace of technology prevented each user from keeping up with the hardware evolution and, combined with the substantial capital needed for development, finally led to the commercialization of hardware. After 1960, no user allowed himself the luxury of building his own hardware, unless it was funded by the U.S. government on a cost reimbursement contract.

In those early days, however, users tended to obtain hardware which was somewhat customized in order to accommodate a particular need. This practice became unacceptable as both manufacturer and user began to realize the benefits to be derived from standardization.

The same economic principles that led to widely used hardware are present now with respect to software. Yet, in the software domain, users and suppliers have still to reach an accommodation which sufficiently recognizes the financial benefits to be accrued by exploiting the software product.

The Product Markets

In the *Fortune* article entitled "Computing for Business Into the '80s," authored by IDC, it was stated that today's installed worldwide hardware base is valued at approximately $95 billion, of which $55 billion is accounted for by IBM. A number of industry pundits have estimated that the value of the software developed by manufacturers as well as users in the past 15 years ranges between $150 billion and $250 billion, including initial dollar payment and subsequent maintenance.

Of this amount, only approximately $1 billion represents the installed software product base sold by the independent software product industry. Thus, roughly .5% of today's software is attributable to this proprietary source. Further, the value of this installed software product base is only 1% of the value of the hardware base.

Yet another view measures the annual sale of software as a function of the $33 billion revenues to be registered by hardware vendors in 1978 as forecast by IDC. Such software would be approximately 2% of the hardware sales.

These quantities can be further refined with respect to the IBM market alone, since most proprietary software is geared to that hardware. IBM's annual software product sales were pegged earlier in this article as approximately $500 million. Converting this annual sales level to an equivalent product value on a one-time purchase basis by assuming a three-year payout, we obtain a $1.5 billion value.

Combining the IBM software product base with that of the independents' proprietary software gives a total value which is slightly under 5% of the worldwide IBM installed hardware base and which is 2% of the associated expenditures for custom software.

IDC also forecast the total 1978 DP users' expenditure at $42 billion, with more than 2% expended to purchase software products from the independents and manufacturers. Approximately 15% of this total budget will reflect in-house software efforts, software being limited to the definition of this paper and, therefore, computed as one-third of the total of personnel expenditures.

Datamation also provided related data in its "1978 DP Budgets" article of January 1978, saying 1.5% to 2% of the user DP budget is spent on purchased software, split 60-40 in favor of mainframe suppliers vs. large, independent vendors. The ratio changes to 40-60 for the very large installations.

In summary, 1978 user expenditures for hardware, internally developed software and outside purchased software will be in the ratio of 26: 10: 1.

Two facts emerge: Proprietary software is still a very small fraction of all software, and proprietary software is an exceedingly small fraction of the investment made in hardware.

The user clearly thrives in a hardware world and, for that reason, has been essentially locked into his computer

(Continued on In Depth/17)

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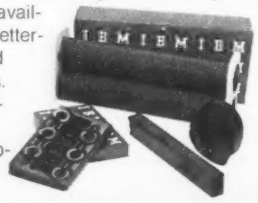

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IN DEPTH

(Continued from In Depth/15)

manufacturer's whims and ways. Hardware has, indeed, guided him through the '60s and '70s, but the age when software will lead the user has now arrived.

A User's Hardware Scenario

Need one be reminded of the transition of users through the batch, on-line, data base and now transaction environments? The scenario is displayed in Figure 10, which shows an IBM-oriented trail reflecting a typical user's movement from a 360/50 to a 360/65, then to a 370/155 and, finally, to a 370/158 configuration.

This user rode the crest of the wave throughout the decade, embracing each of the innovations that became available. Initially, the user started in a batch environment operating under DOS, but soon found he required more sophisticated and complex operations. He advanced to OS which, of course, required additional core.

The user outgrew his batch environment and entered the realm of teleprocessing by first incorporating data entry and inquiry capability with respect to certain limited business functions. These capabilities demanded

(Continued on In Depth/18)

SCENARIO OF A USER'S DECADE OF DATA PROCESSING ENVIRONMENTS

		SYSTEM IMPACT	
COMPUTER	ENVIRONMENT	SOFTWARE	HARDWARE
IBM 360/50	Batch	DOS OS	124K-Byte Memory
IBM 360/65	On-Line	CICS/BTAM	Terminals 512K-Byte Memory Disks
IBM 370/155	Data Base	IMS	1M-Byte Memory Controllers Networks/Channels Mass Storage (DAT Box)
IBM 370/158	Transaction	VS	4M-Byte (Real) Memory Virtual System Front End RJE Stations Data Entry System Extension

Figure 10

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IN DEPTH

(Continued from In Depth/17)

random-access storage, terminals and additional core. The user then required more sophisticated communications software and, therefore, a need for either Btam or CICS. Of course, to achieve the desired response time, an upgrade to the next 360 model was in order.

In 1969 the user was attracted to the newly announced IBM 370 line and opted for a 370/155 mainframe, planning to move in the direction of data base. Now more of the applications would go on-line and, more importantly, all of the files would become integrated under one system; IMS.

In order to achieve the desired throughput and response, additional hardware was needed, involving more mass storage, additional I/O channels, more core and the necessary controllers for remotely placed terminals and the associated communications network.

But in 1972 the user was dealt a blow when the virtual systems were announced and he found himself with a CPU that fell short of this technology. The user, however, was not necessarily bent out of shape if he rented the hardware and was not committed to a long-term purchase. For a modest monthly increase he was able to upgrade to the more modern IBM 370/158. This computer truly promised him the opportunity to enter the transaction-oriented world where virtual memories, as well as an entirely new operating system, VS, would become available.

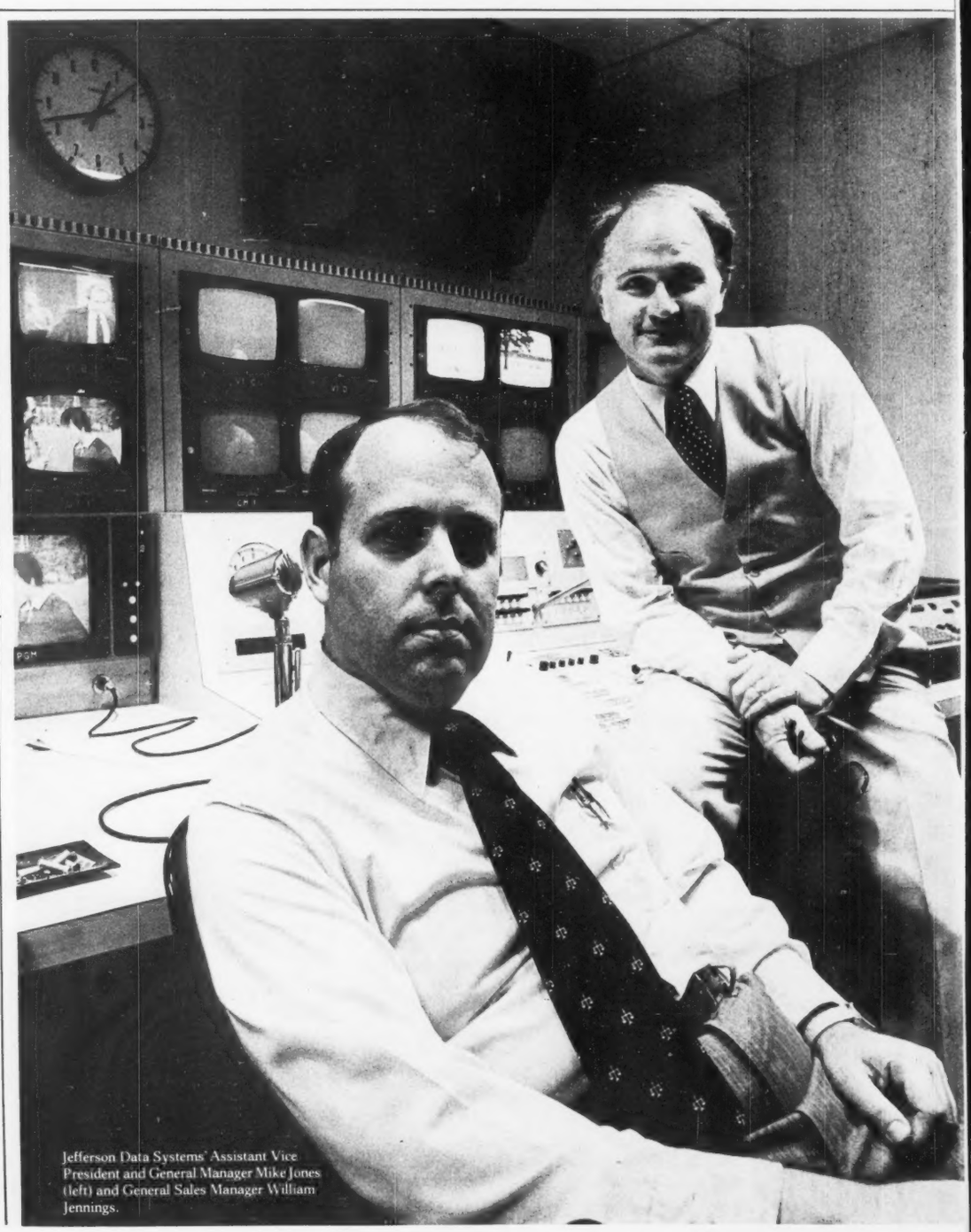
Naturally, he needed a better front end, remote job entry (RJE) stations and more sophisticated data entry equipment. The virtual system became the " silent salesman."

Of course, if the user made an error in calculations and purchased his 370/-155, the manufacturer did not foresake him. There was the opportunity to make a one-time purchase of the famous Dynamic Address Translation (DAT) box with which, for more than $300,000, he could field-upgrade the 155 to a virtual version of a 158.

Throughout the decade, the manufacturer gave the user additional options which would make the hardware perform even more effectively. The user was able to increase his capacity and performance by continually upgrading to higher density and faster tapes, as well as disks, drums and data cells.

All this technology and capability gave the typical user enormous new power and capacity at a price. It was not unreasonable, over a 10-year period, to move through three to four machine models, increase core by a factor of 10, add to auxiliary storage by two orders of magnitude, convert the operating system three or four times and end up with 50 to 100 terminals, both local and remote. The monthly cost for such additional capacity could well have increased by factors of 4 to 6 in that 10-year period.

Under this scenario, our hypothetical user operating a 360/50 computer in 1968 with 128K-bytes of core moved to a 4M byte 370/158 in an on-line, terminal-oriented environment, inclusive of several billion-byte capacity disks. The price/performance index comparing the two end points in-



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IN DEPTH

creased by a factor of 5.

This user could well have spent $7 million in machine rental during the course of these 10 years and be currently licensing software from IBM for a monthly fee of $5,000.

Certainly, we do not begrudge the hardware manufacturer the revenues generated by this lavish use of his equipment. Indeed, by all measures, the individual user obtained somewhat better unit performance as he escalated his hardware expenditure in the direction of more modern and more cost-effective equipment.

IBM has rightfully pointed out in its recent advertising campaign that a series of computations (really instruction executions) costing $1.26 when performed on a 1952 computer can now be executed on present computers for .7 of a penny, or a factor of 180 times less. Even more impressive would be to use fixed dollars, which would yield an improvement factor of 400. However, it is merely pointed out that the cost of *useful* business transactions has been reduced far less — perhaps by a factor of 5 or 10.

We are quick to note that users also substantially upgraded their applications, consistent with the more sophisticated hardware and software environments that were made available to them. Nevertheless, there are users who were paced by the hardware and were rather tardy in breaking out of emulation modes with their prior generation software.

Over the course of the years, in keeping with the ever-increasing complexity of hardware, operating system software also expanded. For example, in the case of IBM, the number of lines of code for the operating and support system software increased by a factor of 10, moving from the 650 machine of the mid-'50s to the 360 and 370 lines of the late '60s and early '70s.

As the hardware manufacturer's operating system became more complex, the user bought more hardware in order to achieve or retain performance. The software product vendor, on the other hand, was obligated to stay in pace with the hardware manufacturer's environmental changes. The net effect was incrementally more hardware sold and greater costs thrust upon the software supplier.

But there is an even more insidious factor involved. The producer of the more complicated operating environment (e.g., the hardware manufacturer offering a data base management system) benefitted in three ways. Not only did it typically charge for the unbundled portion of its operating environment software but, as already explained, it managed, thereby, to sell more hardware.

There is yet a third factor. This is the machine efficiency with respect to operating the application programs themselves.

Over the last decade, the number of machine cycles utilized by the application programs has steadily decreased from approximately 80% to 85% in the '60s to current operations, where one obtains only 40% to 50% efficiency. We recognize in stating this that the additional machine cycles taken by the more complex operating system are not necessarily lost to the user. Many features are now provided by the operating system itself that formerly had to be supplied by the application program or were completely ignored.

Nevertheless, this additional overhead requirement leads to yet further hardware acquisition. Typically, the choice is to add core or upgrade the model of the machine in order to achieve or retain throughput performance so that the application, in the more complex operating system environment, does not degrade in performance.

But manufacturers do not always

(Continued on In Depth/22)

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Instead of seeking an existing corporate general accounting software package, they developed one themselves, using Sycor equipment and support.

The venture was so successful it quickly blossomed into a subsidiary, Jefferson Data Systems. Today, JDS provides distributive software programs to over 60 of America's largest radio and TV stations, as well as their own broadcast properties in North Carolina, Virginia, Georgia and Colorado.

Sycor has always played a key role at JDS. Initially, Sycor 340 and 350 systems formed the nucleus of each station's remote capability. As service demand grew, Sycor 440 systems were deployed. Now, Sycor's most powerful equipment, the new 445 with multifunctional operating software, has been successfully tested and is scheduled to be installed.

"We wanted to provide our clients with equipment that performed without making computer people out of them."

"It's a fill-in-the-blank type of system, which is very easy to handle," according to Bill Jennings, JDS general sales manager. Compact Sycor 440 systems are placed within the stations. Each is used for entry and retrieval of data pertaining to every aspect of the stations' operations, as well as for providing each station with its own data processing capability.

Information is then telecommunicated directly to Jefferson Data's central computer, where it is processed and stored. Processed information is periodically returned to each of the 440 systems over undedicated telephone lines, for generation of program scheduling, contracting, invoicing, and general accounting reports. In fact, the JDS System 80™ package produces over 100 reports for subscribers.

"People have been freed to perform additional tasks."

"Before Jefferson Broadcasting obtained the Sycor systems, at least three or four people per station were required for writing up contracts, and editing the log while moving commercials around. The Sycor systems have automated this entire process. In addition, they have allowed us to tighten operations. Before, six to ten percent of our annual billing was 'falling through the cracks.' And with 30-second commercials costing as much as $20,000, losing one was a very expensive proposition. Now, once data is entered into the system it is never lost.

One of the Sycor systems that helps Jefferson Data Systems' subscribers save time and organize work.

"We went to Sycor after evaluating several manufacturers. We feel they have one of the finest technical and service organizations in the world."

"We've never had anybody miss a processing day or lose a log," boasts Jennings. All JDS accounts have a toll-free number and access to Sycor's National Dispatch Service in Ann Arbor, Michigan. There, 20 operators and 13 Sycor terminals are available 24 hours a day to handle service calls. As calls are received, information is relayed to one of more than 110 service locations. "In all of the applications we're now performing, the Sycor equipment is fantastic," adds JDS Systems Engineer John Reidy.

Call Sycor toll-free at 800-521-2838.

For more information on how you can get a Sycor system performing for you, call Tony Fazio, VP Sales. Or write us at Sycor, Inc., Box D, Ann Arbor, MI 48106.

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The HP 300. The small

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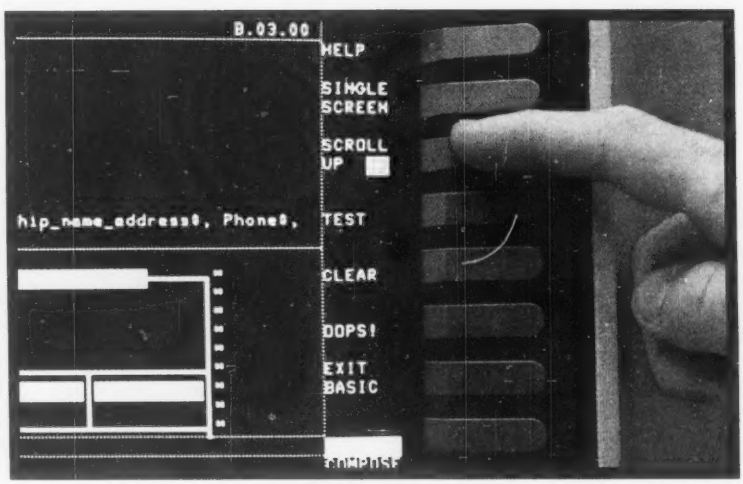
The secret lies in HP's proprietary silicon-on-sapphire technology and in its 'big computer' operating system, AMIGO/300. We condensed the CPU logic and circuitry on to six CMOS/SOS chips to combine high speed of execution with very low power consumption.



A very grown-up operating system.

The HP 300 can be used interactively, for such things as program development and job scheduling, at the same time that it's printing reports, processing transactions, sorting files or gathering data from up to 16 terminals.

With virtual memory and as much as one megabyte of error-correcting main memory, you can manipulate large data sets and run big programs. With a full data base management capability, IMAGE/300, you can organize and access information quickly and concisely. And six different file structures, including keyed sequential, allow you to choose the structure that fits the application best.

AMIGO/300 supports two business languages—RPG II and BASIC. And the system can grow from its built-in 12 megabyte fixed disc to 260 megabytes of disc storage.

For all its big system capability, the HP 300 is remarkably simple to program and operate.

Its integrated display system (IDS) has eight soft keys at the right of the screen. These can be programmed to lead the user step-by-step through each job.

The screen itself can be split into as many as 8 'windows' for displaying and controlling various aspects of one or more applications. You can also scroll each area horizontally or vertically—up to 160 columns wide and several thousand lines long.

Another example of this simplification is a 'Test' key which gets BASIC and RPG programs running automatically without your having to take them through the various preparation stages before the computer will execute.

And you get all this in a low-cost system that fits handsomely into any office environment, plugs right into a 10 amp 115-volt outlet, and is quieter than most office copiers. Impressed? Then a hands-on demonstration will really convince you that the HP 300 is a major step forward in business computers. So call your nearest HP sales office listed in the White Pages for a closer look. Or write to Hewlett-Packard, Attn. Bob Kadarauch, Dept. 344, 11000 Wolfe Road, Cupertino CA 94015.

HEWLETT hp PACKARD

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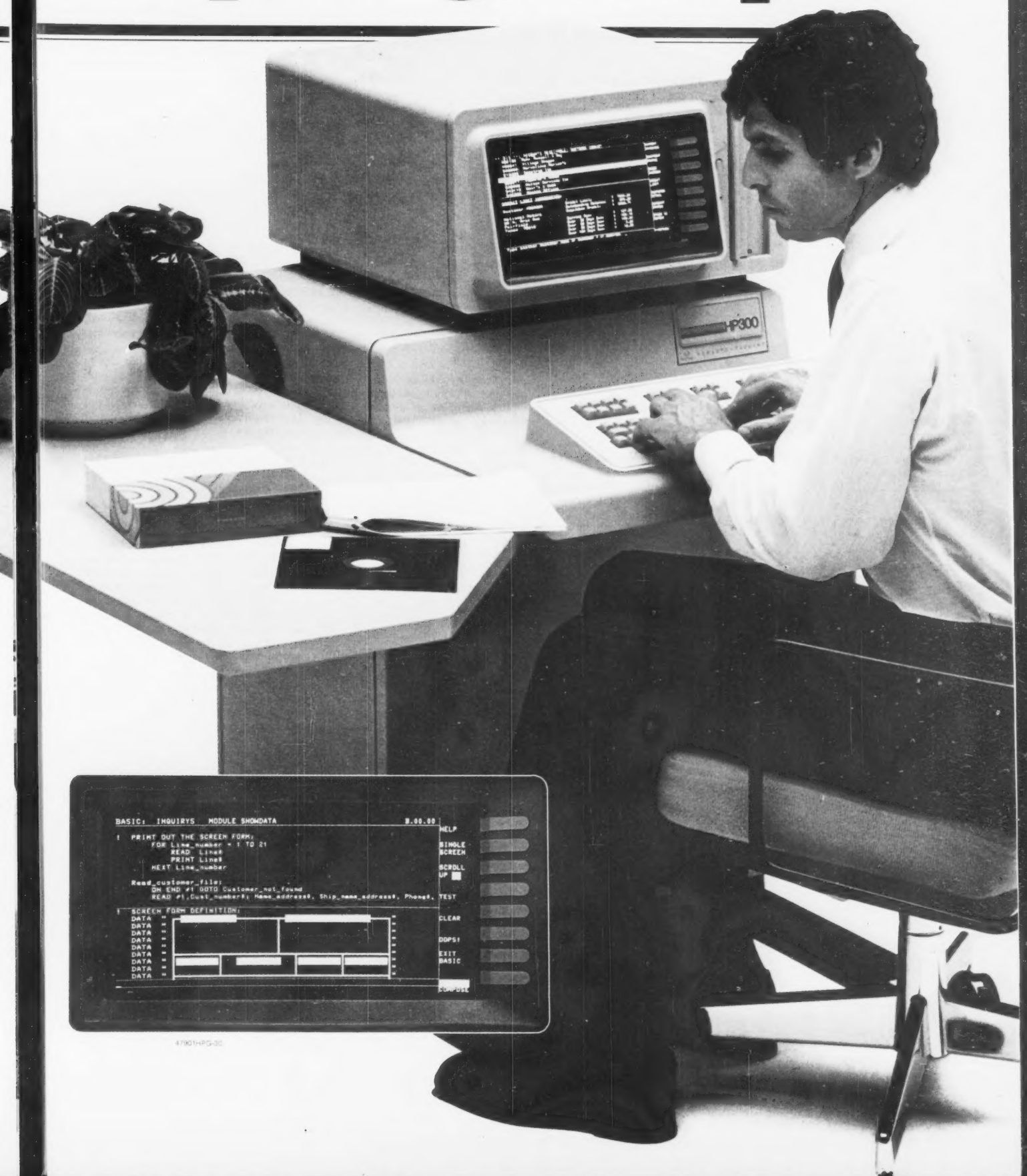
computer grows up.



4790THPS-30

IN DEPTH

(Continued from In Depth/19)

make it easy for the user. Sometimes there was planned obsolescence to induce upgrading by the user. All one had to do was produce more modern peripherals and limit their operation to the latest CPU and/or operating system. This was the case, for example, in going from the 2314 to 3330 storage devices, forcing a move from the 360 to the 370 family. Thus it was possible to replace a 360/65 by a 370/158, reduce the actual cost of auxiliary disk storage and, in the process, enjoy more capacity and faster performance, but with the requirement of a system family and model change.

Another technique was to limit the core size in one CPU model to force an upgrade to the next model level when more capacity was required.

How many users began to put up CICS and/or IMS environments as a result of experimenting and finding two terminals working exceedingly well? What was not appreciated was the nonlinearity in hardware demand as a function of increasing the number of terminals. Hence, more terminals were added, more of the processor capacity was taxed, response time dropped — and the users complained.

A ready solution was the addition of more hardware to sustain the application performance, which by this time had reached the point of no return — the software had been implemented. After all, the end user wants to be satisfied, and more hardware can usually do the trick in a rather transparent way.

These hardware vendor strategies lead the user to fret and worry about what is around the corner. In such an environment, the user is prone to rent for fear of being locked into antiquated devices.

But times are now changing. With the prospect of long-term availability of higher performance and more cost-effective, compatible hardware, the user can focus on his cumulative investment in software. Extending the life cycle of developed software will realize economic benefits heretofore not readily available.

However, this very fact creates a new problem for the user and the independent software product supplier — the software lock-in — to which we will turn in a subsequent section.

THE MAKE-OR-BUY ECONOMICS

	MAKE	or	BUY
Estimated Development Cost	$250,000		$35,000
Evaluation Cost	Not Available		$15,000
Development Time	15 Months		3 Months
Conversion Cost	$50,000		$50,000
Conversion Time	3 Months		3 Months
Expected Annual Savings	$100,000		$100,000
Payback Starts	18 Months		6 Months
Investment Recaptured	54 Months		18 Months

Figure 11

The Make-or-Buy Decision

By this point it would seem that a clear economic case have been made for purchased software in the form of a product. Key elements of the argument has been presented in the form of software availability, reliability, maintainability and risk reduction.

Nevertheless, as has been seen, the volume of software product sales is still very small in terms of total DP expenditures. Perhaps, then, it is still a matter of educating the users with respect to the cost effectiveness of the software product — and to both the direct and indirect benefits.

The direct benefits are the avoidance of the classical in-house cost components, including a requirements study, feasibility analysis, functional design, system specification, hardware requirements, programming, testing, documentation and maintenance.

Significant indirect returns are a result of:

- *Opportunity costs.* The ready availability of a purchased product permits earlier operation and, therefore, the earlier start of the payback period, as well as the improved operation desired in the first place.
- *Lower risk.* Fixed specifications and a fixed price limit the risk associated with any software developmental activity — meeting project completion schedules, staying within cost forecasts and achieving operational goals set forth in the functional specifications.
- *Key manpower savings.* A smaller number of key personnel, from both the user and the DP environments is involved in reviews and evaluation of the requirements, feasibility analysis and the formulation of functional specifications.
- *Up-front documentation.* Contrary to software developed in-house, where documentation is typically the last item to be accomplished (if at all), vendor-provided products include up-front documentation.

Besides all of the above, do not forget the leverage that a body of users has with the software product vendor. Supported proprietary software provides product integrity, the capacity to handle a broad set of requirements and continual enhancements which respond to both the application and DP environmental changes.

The bottom line in a make-or-buy decision is measured in savings to the user and can be analyzed in most cases as illustrated in Figure 11. Here the trade-off clearly shows the benefit of the software product, where the payback period starts a full 12 months earlier and the investment is recaptured one-third of the time sooner than an in-house development effort.

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Werner L. Frank is executive vice-president and a director of Informatics, Inc. The firm is an independent supplier of software products, professional services and information processing services.

Frank is a co-founder of Informatics and has been active in the management of the company for the past 17 years. During that time he also was president of Equimatics, Inc., a joint venture of Informatics and The Equitable Life Assurance Society of the U.S.

Previously he was on the senior staff of TRW, Inc. in its Space Technology Laboratories and Ramo Wooldridge (1955-1962).

Frank has a B.S. in mathematics from Illinois Institute of Technology and an M.S. in mathematics from the University of Illinois. He has published more than 20 papers in numerical analysis and general DP subjects concerned with on-line systems and software development.

On-Line Club Members Buy Sans Cash

BERKELEY, Calif. — When members of a minicomputer-assisted trade club here want to buy a particular product or service, they don't pay for it with money. Instead, they give the owner something they already have and, in return, receive an equivalent amount of the desired product or service.

In short, the trade club members have instituted a barter system that has replaced cash as the main medium of exchange.

Organized in mid-1977 by Blue Key Exchange, Inc., the club consists of hundreds of northern California businesspeople who rely on a minicomputer system to keep track of all their trading activities within the group.

Ron Keister, Blue Key's president and cofounder, likens the cooperative arrangement to a typical credit card service like Visa, Master Charge or American Express.

Under the plan, members pay a small membership fee plus a percentage-based monthly service charge for their "purchases." In return, they receive a credit card, which they can use to "buy" commodities from other group members.

"In effect, [club members] are trading services and products," Keister explained. "For example, if an office supply store [proprietor] sells stationery worth $500 to four different members, he then has a $500 credit which he can use to buy whatever he needs from other Blue Key members."

Business people profit from the arrangement in two ways, the Blue Key president said. First, it allows them to obtain other companies' products and services at wholesale prices. Second, it opens new customer territories that otherwise might remain forever beyond their reach.

Not surprisingly, area entrepreneurs have responded enthusiastically to the service. The trade club is believed to be the only one in the U.S. to use its own mini system.

Since its formation about 18 months ago, the club has attracted some 800 enrollees from the local business community, and new members join the organization almost every day, Keister said.

"Our clients include anyone who has a product or service," he continued. "We have attorneys, plumbers, manufacturers of all kinds and even a mobile disco."

Plans for Expansion

The automated bartering service has also earned high praise from Blue Key itself. In fact, the company plans during the next few years to expand the existing club into a nationwide operation.

To accomplish this goal, however, Blue Key will first have to expand its minicomputer system, which currently incorporates a Jacquard Systems, Inc. J100 CPU, two CRT terminals, two 12M-byte Pertec Computer

(Continued on Page 66)

Instat System Fits in Carrying Case

By Jeffry Beeler
CW Staff

LAKEWOOD, Colo. — Another hardware vendor joined the growing number of firms that offer on-site data storage and processing capabilities when Instat Systems, Inc. recently introduced a portable, 35-lb computer system that fits inside a brushed-aluminum carrying case.

Like the Durango Systems, Inc. F-85 and other portable computers that preceded it, the 17-in. by 21-in. by 7-in. Instat system reportedly fits under a passenger airline seat and performs all the basic DP functions — storage, processing and I/O — from a standard 110 Vac wall outlet.

As a result, the system allows users to take their computing resources with them wherever they go and set up temporary DP shops in locations where on-line processing would otherwise be unavailable. Typical operating environments for the system, which has no model number or designation at present, include retail outlets, materials warehouses, accounting offices and remote sites in large industrial corporations, according to an Instat official.

Unlike the F-85 and other competitors, however, the Instat configuration consists, not just of an integrated computer system, but of two additional hardware modules: a data-storage cartridge called Instapak and a hand-held data entry terminal nicknamed the Encoder. Depending on their application needs, users can order an Instat system with just one Encoder terminal and one Instapak data cartridge, or many such units.

Powered by three AAA-sized batteries, the reusable cartridges fit inside the data entry terminal, where they store 4K to 16K characters each. When filled to capacity, the cartridges are removed from the Encoder and inserted in one of three slots in the Instat system's CPU, where they disgorge their contents without requiring keypunching or other intermediate data entry steps.

This ability to transfer data directly from the hand-held terminal to the processor constitutes one of the system's chief advantages over other portable computers, the Instat official claimed.

Unlike most other data entry terminals of its type, the Encoder uses a "Touch-Tone" audio feedback system instead of a conventional LED read-out. When depressed, each of the terminal's 10 numeric keys emits a different monotone, which users can hear through an earphone that plugs into the unit's upper left corner.

By noting each tone, users can

(Continued on Page 64)

Instat's portable computer system consists of a CPU, hand-held data entry terminal and data cartridge that users can transfer directly from the terminal to the processor.

Prepare Now For Distributed Nets Or Lose Jobs, Exec Warns DPers

By Jeffry Beeler
CW Staff

WESTBORO, Mass. — Distributed processing is quickly coming of age, and DP managers who don't begin preparing now for its ascendancy could be left out, according to Art Lynch, Data General Corp.'s marketing manager for terminals and communications.

For years, users and vendors alike have recognized distributed processing's potential benefits, but until recently a host of difficult technical obstacles made widespread implementation of the concept nearly impossible.

Today, however, most of the hurdles that prevented distributed processing from realizing its full promise no longer exist, Lynch said here during a recent interview. Hardware technology has improved with the appearance of increased memory densities and enhanced peripherals.

Data communications has evolved with the advent of satellite business systems and packet-switching networks, and service capabilities have expanded, at least among the top three mini makers.

Only one major obstruction now remains in distributed processing's path, and most of that opposition comes, ironically, from the nation's DP managers, many of whom see the concept as a threat to their professional authority, Lynch asserted.

Occupational 'Dinosaurs'

When this last barrier to distributed processing falls, as it almost certainly will, an unprecedented torrent of networking activity will quickly follow. DP managers who adapt to the impending change will survive; those who resist it will become occupational "dinosaurs" whose jobs will be swept away as decentralization takes over, Lynch warned.

At present, the biggest push toward distributed processing is coming, not from corporate-level

(Continued on Page 64)

Microdata Boosts Printer's Speed

IRVINE, Calif. — Microdata Corp. has reportedly boosted the speed of its Matrix printer by more than 25% without increasing the unit's price.

With the improved performance, the printer now outputs 165 char./sec, compared with the previous speed of 120 char./sec, according to a Microdata spokesman. The increase in printing speed resulted from a simple change in the Matrix unit's printhead.

Like its 120 char./sec predecessor, the improved Matrix printer costs $2,800 in single quantities and $1,470 in OEM quantities. Microdata is at 17481 Red Hill Ave., Irvine, Calif. 92714.

Prepare for Distributed Nets: Lynch

(Continued from Page 63)

DP managers, but from their colleagues in the field, where decentralization promises increased efficiency and control over computing resources.

Eventually, however, pressure to decentralize will become unbearable even in the highest DP echelons. User organizations that try to ignore the pressure and stick with centralized computing will find themselves increasingly unable to compete with rival companies that have taken the opposite approach.

As distributed processing spreads during the coming years, DP management and organizational challenges will multiply, he added. The activities of remote computing sites will become increasingly difficult to coordinate as user departments gain more and more control over their DP affairs.

Lines of authority will lose clarity and require redefinition, and redundancy of effort will become a growing hazard.

New Management Skills

At the same time, the growth of distributed processing will demand the acquisition of new management skills, Lynch explained. DP managers will have to learn to standardize the languages their departments use, deal (possibly for the first time) with common carriers and run larger and more diversified organizations than they usually supervise.

They will also have to learn how to cope with multiple hardware vendors, he predicted. This principle will apply particularly to users who in the past have relied exclusively on IBM equipment.

"I don't think traditional all-IBM shops will be able to survive in the distributed processing environment of tomorrow," he observed. "They won't be able to take advantage of all the technological offerings available in the market."

How can DP managers best prepare for the inevitable proliferation of distributed processing networks? First, they should learn the necessary management skills by consulting other DP professionals and attending meetings of the computer industry's various professional organizations.

Then, they should take the plunge and try to implement their first distributed processing network. "Propose the project to management as an experiment or as an R&D expense, and inform them of the risks involved," he advised users.

After receiving approval for their proposal, DP managers should proceed slowly. Instead of trying to decentralize their entire DP operation in one bold stroke, they should start with one site, perhaps a department or small division, and then continue as circumstances allow, Lynch said.

Device Tests Mini Software

SAN DIEGO — Users can reportedly develop and test machine-code software for minicomputers and microprocessors with a read-only memory/random-access memory (ROM/RAM) simulator from Electro-Design, Inc.

The ED-6000 loads data at 9,600 bit/sec into any minicomputer or microprocessor equipped with an RS-232 interface or IEEE-488 bus. Data entry units accommodated by the ROM/RAM simulator include teletypewriters, high-speed CRT terminals and paper-tape readers.

The unit costs $4,500 and is available at 7364 Convoy Court, San Diego, Calif. 92111.

System Fits Inside Carrying Case

(Continued from Page 63)

identify which keys they have just hit and, in so doing, verify the accuracy of their keyboard entries, the official explained.

Because this audio feedback system dispenses with power-consuming visual displays, it prolongs the life of the Encoder's four AA-sized batteries up to 3-1/2 times, he said. The feedback system also reportedly speeds keystroking by as much as 50% by allowing users to enter data without continually watching the terminal's keyboard.

In addition to the audio feedback system, the portable computer provides an RS-232 interface that can accommodate a modem with a built-in telephone coupler. When Instat makes such a modem available in May or June, the system will be able to send Instapak-stored data over phone lines to host mainframes at 300- or 1,200 bit/sec, the official noted.

Suits Many Users

Though originally designed for the professional inventory field, the portable system suits a wide range of users including wholesalers, government employees, researchers, educators and business personnel.

With the hand-held Encoder terminal, users can collect assorted data at branch offices and other out-of-the-way locations, immediately enter that data into the accompanying computer and then turn the raw input into financial reports, billings, mailing lists, purchase orders, inventory listings, labor reports and other finished documents.

Instat particularly recommends the portable system for traveling executives who often need temporary computing power or the ability to access large quantities of data at a moment's notice.

Hardware modules that fit inside the system's carrying case include a CPU that expands in 16K-byte increments from 16K- to 64K bytes, two minicassette tape units that store 320K bits each and a 96-char. alphanumeric printer that outputs 120 char./sec. The printer generates documents on company letterhead, 8.5-in. by 11-in. sheets or on 3.5-in. by 8.5-in. rolltype paper.

In addition, the integrated system includes a single-line, 40 char. dot matrix display with a typewriter-like alphanumeric keyboard and a 10-key numeric pad.

Starting on Jan. 26, Instat will offer the system with a set of application packages for the professional inventory field, the official said. Then, in February, the firm will expand its application program family with general ledger and income balancing packages.

Eventually, the firm plans to offer its portable system with application software packages for billing, mailing lists, research computation and specialized accounting functions.

A 32K-byte Instat portable computer with software costs $9,950, compared with $256 for each Encoder data entry terminal and $253 for each 4K-char. data cartridge.

Shipments of the system start Jan. 31 from Instat at 1475 S. Pierce St., Lakewood, Colo. 80226.

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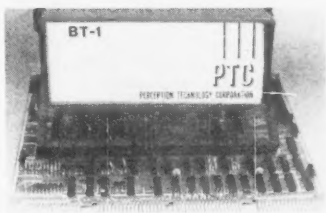
PTC Voice Response System Works With PDP-8, PDP-11

WINCHESTER, Mass. — Digital Equipment Corp. PDP-8 and PDP-11 series minicomputers can reportedly "talk" in natural human sentences or phrases with a voice response system from Perception Technology Corp. (PTC).

A spokesman for the company credited the BT-1 system's ability to speak instructions, questions, answers and alarms with freeing users from monitoring display panels and signal lights in computerized control systems.

Plug- and software-compatible with PDP-8s and PDP-11s, the voice response system suits applications in which any predefined statement can elicit several possible responses, according to the spokesman. The system is also said to suit applications like remote communications, laboratory and industrial automation and software development.



PTC's BT-1 voice response system lets DEC's PDP-11 and PDP-8 minicomputers 'talk' in natural human phrases.

Compressed Speech

Instead of relying on computer-synthesized voice responses the system uses prestored, telephone-quality human speech.

When creating a vocabulary for itself, the BT-1 reportedly uses a proprietary software package to compress digitized magnetic recordings of male and female speech.

Depending on the number of consonants, the system compresses stored words by a factor of up to 5, the source said.

With a speaker, amplifier, cable and standard 13-word vocabulary, the BT-1 sells for $1,200; additional words cost $20 to $30 each.

PTC is located at 95 Cross St., Winchester, Mass. 01890.

Qantex Storage, PDP-11 Linked

HAUPPAUGE, N.Y. — Users of Digital Equipment Corp. PDP-11 minicomputers can reportedly link their systems to Qantex's Model 2200 and Model 2700 cartridge storage systems with an RS-232 interface card that transmits 55- to 19.2K bit/sec.

Packaged on one printed circuit board, the interface fits in a 2200's or 2700's enclosure and uses the same power supplies as the 8.6M-byte recording units, according to a source at Qantex, the interface's developer.

An on-board microprocessor and read-only memory reduces the number of host computer instructions the interface needs to store and retrieve data, the spokesman explained.

The unit costs $695 from Qantex at 60 Plant Ave., Hauppauge, N.Y. 11787.

VMOS Power Supply Has Quick Switching

SUNNYVALE, Calif. — Switching times can reportedly be reduced to one-tenth of those usually achieved by competitive power sources with a VMOS power supply from Advanced Electronics Design, Inc. (AED).

Weighing 10 lbs and measuring 11.25- by 5.25- by 3.8 in., the AED 301 is smaller and lighter in weight than comparable bipolar power supplies, according to an AED spokesman.

The VMOS power supply costs $545 and is available from AED at 440 Potrero Ave., Sunnyvale, Calif. 94086.

Reader Replaces CR-11

FRAZER, Pa. — A replacement for the Digital Equipment Corp. CR-11 card reader costs about 40% less than its DEC equivalent in single quantities and more than 50% less in quantities of four, according to a spokesman for Cardamation Co., the product's developer.

Compatible with DEC's PDP-11 minicomputer series, the CR 300/11 card reader reportedly outputs 300 card/min and incorporates a vacuum feed mechanism that accommodates worn or damaged cards.

A CR 300/11 subsystem consists of the card reader, interface cable and interface that plugs into any PDP-11 backplane.

In single quantities, the system costs $3,795; in quantities of four or more, $2,850. Cardamation can be reached at Box 746, Frazer, Pa. 19355.

Cardamation CR 300/11

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Network Wraps Up Package Maker's Work

LUND, Sweden — An international package manufacturer headquartered here is meeting its line managers' demands for local information control as well as coping with a 20% annual growth rate by implementing a minicomputer-based distributed DP network.

Although Tetra Pak is one of Sweden's 100 largest firms and operates worldwide, it is unusual because it is privately owned and manufactures a single product.

Formed in 1945, Tetra Pak was based on a then-new process of manufacturing tetrahedral packages for distributing milk, juice and similar products. The packaging machines Tetra Pak offers are manufactured in Lund and rented to dairies and soft drink producers, which are then supplied by Tetra Pak with the rolls of packaging material.

In 1945, Tetra Pak used a single packaging machine but by 1977, it manufactured 22 billion packages for worldwide usage.

Need for Increased Service

Such rapid growth of its operations resulted in an increased need for computer services, according to Tetra Pak spokesman Sven Elvstad. In the mid-1970s, Tetra Pak's central DP facility here acquired a mainframe system that provided DP services primarily to the parent company and partly to its subsidiaries. But because these subsidiaries are located throughout the world, some applications processing at the central facility proved inefficient.

In 1976, the larger subsidiaries were demanding their own computer systems and the company's DP department seriously considered distributed processing with minicomputers. Tetra Pak's managers, however, recognized the risk and cost of allowing several subsidiaries to separately develop and implement their own programs on their own computer systems.

After much deliberation and consultation, they finally decided that the computer department here would continue to use and develop systems with the central computer, but that the subsidiaries would get smaller systems, Elvstad said.

In addition, Tetra Pak decided programs should be developed centrally for production planning, accounting, order processing, billing, spare parts control and statistical applications. Other routines, such as payroll, would be produced locally by each subsidiary.

In shopping for the new smaller systems, Tetra Pak looked for a computer supplier with a range of compatible systems suitable for online commercial DP. The manufacturer would also have to provide adequate support in the many European countries in which Tetra Pak operates.

Among the manufacturers Tetra Pak considered were IBM, Digital Equipment Corp., Burroughs Corp. and Data General Corp. The company determined that DG seemed to fulfill its criteria, and that manufacturer was tentatively chosen.

After making that choice, Tetra Pak arranged a meeting with representatives of the appropriate subsidiaries to discuss their computing plans and how they wanted them realized.

In addition, representatives of each subsidiary visited their local DG representatives before a final decision was made to go with that company's equipment, Elvstad explained.

The First DG CS/40 Model C3 small business computer system with the interactive Cobol programming language was installed here, where it was used for applications program development. After a time, it was removed and transferred to Denmark, where it was installed with the development software. At that point, Tetra Pak ordered another development system.

Present Situation

At present, two more CS/40 systems have been installed, one in Helsinki, Finland, and another in Vienna, Austria, with a third unit on order for Tetra Pak's Norwegian operations. All the systems incorporate a 20M-byte disk unit, Dasher CRT terminals and a 300 line/min printer.

In addition, four DG Eclipse C/330 systems have been ordered and installed at Tetra Pak sites in Sweden, Switzerland and Germany. Those installations incorporate 256K-byte CPUs, DG's Real-Time Disk Operating System, 10M- or 96M-byte disk units, Dasher CRT console, dual diskette units, 800 bit/in. magnetic tape units, 300 line/min printer, communications chassis and asynchronous multiplexer.

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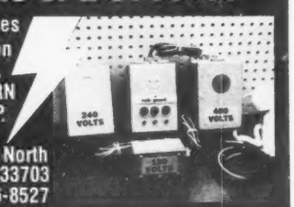

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Club Members Buy Without Cash

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Corp. D3000 hard-disk units and a 200 char./sec printer.

Before Blue Key acquired its current configuration, the company monitored trading activities among club members by borrowing time from an outside firm's processor. That alternative, however, proved risky because it left the club's data base vulnerable to security breaches — one of Keister's chief DP concerns.

"If someone who knew the computer program left our company, that person could dial the computer and have access to the data," he explained. "So getting our own system was really a necessity, and the difference between the cost of time-sharing and purchasing our system was minimal."

Since Blue Key replaced its outside batch processing system with its first in-house minicomputer system, the company has trimmed two full-time employees from its clerical staff. "Monthly statements alone would take two staff members a week to complete by hand, and writing a directory would take months," according to Blue Key's accounting manager, Katherine Marsh.

Another of the system's user benefits is its capacity to support up to 16 concurrent disk units, Marsh said. Though not a necessity now, this mass storage capacity could prove invaluable when Blue Key expands its existing minicomputer configuration to support a nationwide trade club membership.

In such an operation, the club's branch offices would supply the home office here with a monthly disk containing all the transaction data gathered in the field. "With 16 disk drives, we would be able to run all this information through the computer and keep track of all transactions, and members throughout the country," Keister observed.

Mini-Controlled Transactions

Distributed by locally based Mini-Tech Systems, Inc., Blue Key's current minicomputer system controls all the company's accounting and membership transactions, Marsh explained. These functions include issuing credit clearance to ensure that members have credits in their accounts when they "buy" something, posting vouchers to transfer money from a purchaser's to a seller's account, updating the club's membership list and calculating service charges.

Because of the local trade club's large number of members and the frequency of their account transactions, Blue Key maintains a "tremendous" amount of data that must be instantly retrievable, Marsh said. Most of this data appears in the club's voluminous membership lists, which specify facts like member names, addresses, phone numbers, service charges, account status and occupational descriptions.

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User Learns Cost Isn't Everything

By Ann Dooley
CW Staff

DUNDEE, Ill. — For a microcomputer user here, trying to buy micro equipment as cheaply as possible was the most expensive decision he ever made.

Kenneth Sibrava, president of Synersystems, bought equipment from a wholesaler instead of the manufacturer and received more than he bargained for in malfunctioning equipment, misleading promises and costly time delays.

A year ago Sibrava and his associate, Dennis Pikarski, decided to form a consulting firm and service bureau to provide accounting and business functions to doctors, lawyers and other small or medium-size businesses in this Chicago suburb. Sibrava planned to use a series of microcomputers linked together to maintain a low overhead.

Although Sibrava and Pikarski had some DP background, they had difficulty selecting the microcomputer equipment needed to set up their business. "The micro industry is like a jungle," Sibrava said.

After looking at equipment from a number of companies, including Texas Instruments, Inc., Intel Corp. and Imsai Manufacturing Corp., as well as talking to both manufacturers and dealers, Sibrava decided to use Cromemco, Inc. equipment. "It came down to a price comparison. The Cromemco equipment does as much as most others and costs a lot less," Sibrava said.

Right Choice, Wrong Source

The choice itself was the right one, according to Sibrava: "I'm still amazed I got equipment that does what it does for the price. The mistake we made, however, was trying to get by even cheaper."

At the time, the company needed a certain amount of equipment but had only a limited amount of money. "We decided to go strictly by price and to purchase most of the equipment from a Syracuse, N.Y. wholesaler," he said, but declined to name the wholesaler because he is considering suing the organization.

Sibrava agreed to buy two Cromemco computers — a Z-2 fully assembled factory unit and a Z-2D kit. The fully assembled unit malfunctioned as soon as it arrived; it was later found to have been assembled in the wholesaler's shop and not in the factory at all, according to Sibrava.

The kit's seals had been broken, working parts had been replaced with defective ones and the wholesaler had sold memory that wasn't even compatible with the equipment, he charged.

It took more than two months to get all the parts and then everything malfunctioned at least once, including all the memory boards, controller boards, disk drives and CPUs, Sibrava said.

Manufacturer to the Rescue

Since the wholesaler was completely uncooperative and refused to do anything

(Continued on Page 68)

For $2.75/Hour

DBC Planning At-Home T/S Service

By Jake Kirchner
CW Washington Bureau

McLEAN, Va. — Digital Broadcasting Corp. (DBC) next month will begin offering what it said is the first low-cost time-sharing network for home use.

The service, called Compucom, will be provided by the Washington, D.C.-area company for $2.75 per hour. DBC Chairman William von Meister said his company expects to have 10,000 customers locally by the end of the year and reach a financial break-even point within six months after start-up.

The low rate for computer time is possible, von Meister said, because the service will make use of existing computer systems and be available only from 5 p.m. to 9 a.m. and on weekends and holidays.

The idea behind Compucom, he explained, is to answer the question, "What do you do with your computer network after 6 o'clock at night when business doesn't use it anymore?"

"Sell it to home users" was the answer arrived at by DBC, a privately held company spun off one year ago from TDX Systems, Inc. of Vienna, Va. DBC's primary business service, Infocast, transmits data over the radio frequencies of 56 FM stations around the country.

'"That's the problem we've licked . . . how somebody in Seattle can use a computer in Washington, D.C., for $2.75 an hour" when long-distance phone calls cost $15 to $20 an hour.'

What makes Compucom practical, von Meister said, is that the $2.75 per hour charge includes the cost of the telephone call to access the firm's computers, located here and in Silver Spring, Md. "That's the problem we've licked," he said, "how somebody in Seattle can use a computer in Washington, D.C., for $2.75 an hour" when long-distance phone calls cost $15 to $20 an hour.

DBC solved that problem by "some very interesting network configurations." Not only does the firm have an extensive network of its own, but it has contracted with large companies to use their excess private telephone lines during nonbusiness hours.

The system DBC has put together has ports in 200 U.S. cities, so every Compucom user will be able to access the system through a local, toll-free phone call. The system is being tested in the Washington, D.C., area now. It will be gradually extended to those 200 cities as DBC's marketing and management capabilities are developed, according to von Meister.

Access to 2,000 Programs

Using an existing home computer or terminal or a terminal available from DBC, a user can access at 600 word/min approximately 2,000 programs offering complete business packages, computer games and news and information services. The system already offers stock market quotations, professional sports information, classified advertising and movie guides, and additional programs are being developed.

DBC is currently negotiating with individuals to produce periodic "columns" on different consumer subjects — such as "Gourmet Recipe of the Week" — to fill the "homes in on programs that were typically written for the commercial market," von Meister said. The 2,000 currently available programs are indexed in a "very, very simple tree" which contains 24 "master libraries," each having 10 to 200 subheadings (programs).

Compucom is based on an undisclosed number of Prime Computer, Inc. Model 500, Honeywell, Inc. 1648 and Tandem Computers, Inc. minicomputers. The system presently offers about 4,000 ports, which von Meister reckons as capable of serving 50,000 customers. The system can be expanded almost infinitely, he said, by adding more computer power.

Terminals Available

DBC is also offering a range of equipment for the user of the system. The Source 1, an alphanumeric keypad manufactured by Hazeltine Corp., is available from DBC for $595. On a lease-purchase plan, the Source 1, which comes with an acoustic coupler and a hook-up for the user's television, costs $90 down and about $13/mo on a five-year basis.

Another terminal, the Source 2, described by von Meister as a "full-blown CRT of high commercial quality," costs $950. DBC will also provide a selection of two printers manufactured by Centronics Data Computer Corp. and Anadex, Inc. The printers will operate at 30 char./sec.

If a customer has his own terminal or home computer, he can access Compucom for a $100 installation charge which does not include an acoustic coupler. Couplers can be purchased from DBC, von Meister added.

'When a user opens his account with Compucom, he provides his Visa, Master Charge or American Express card number. At the end of each month DBC will compute the user's bill and enter it on a master billing tape, which will be taken to a bank; the billing will be processed through the credit card companies.'

User access to the system is established through a unique identification number and a password supplied by the firm. The user is billed for computer time in one-minute increments. When a user opens his account with Compucom, he provides his Visa, Master Charge or American Express card number. At the end of each month DBC will compute the user's bill and enter it on a master billing tape, which will be taken to a bank; the billing will be processed through the credit card companies.

By not having to handle the billing directly, von Meister said, DBC can operate with a low overhead. Estimating an average 20 hours per month per user, he projected revenues of about $275,000/mo once the system has 10,000 users.

Such projections are not at all unrealistic in the face of the demand for Compucom that has developed since the service was first publicized last month, according to von Meister. "We're being bugged to death" by people wanting to sign up, he said. "The problem is we don't have enough equipment yet.

(Continued on Page 68)

Service to Offer At-Home T/S for $2.75/Hour

(Continued from Page 67)

"The problem is that the logistics of the marketing of something of this size are substantial. So we're going to go city by city, and Washington is the first market, which is natural because we're headquartered here," von Meister pointed out.

"Compucom will then be offered in one other city, perhaps Detroit, before being made available in New York City, which von Meister described as "the next logical place to go."

The service is now being used on an "experimental" basis in Washington, where "we've got about 50 people who are fiddling with it and helping us debug" the manuals and literature, he added.

Besides the low cost of the service, one of its big attractions is that it is completely interactive, according to von Meister. It offers an "electronic mail box" through which users can leave messages for each other.

In addition, a program called Chat offers "direct interaction." After calling up Chat on his terminal, a user can punch in the code number of another user and communicate directly.

In this regard, Compucom is much more advanced and attractive than the videotext and teletext systems being tested in Europe, von Meister claimed. "You're not just looking up information" as with those systems.

In addition, von Meister contended Compucom will be superior to any commercially available personal computer. "We have Cobol, Basic, Fortran, PL/I, RPG, Teach and several other languages, and they are much easier to use than micro assembly language and micro levels of the higher level compilers such as Fortran and Basic," he said.

User: Cost Not All

(Continued from Page 67)

about the equipment, "in desperation I called Cromemco, not knowing what to expect since it really wasn't the manufacturer's problem," Sibrava recalled.

Cromemco's people in Mountain View, Calif., were hesitant at first, but after Sibrava talked to Cromemco's customer support engineer, Allen O'Neill, help began arriving. Cromemco replaced the defective parts, many at no cost.

"The people there kept telling me they couldn't believe the poor job that had been done just in assembling the Z-2," Sibrava said.

Once most of the parts had been replaced, O'Neill spent several days working with the system and looking for bugs.

"If it hadn't been for the factory, I would have jumped off a bridge," Sibrava admitted.

Behind Schedule

So many things had gone wrong at the beginning that it took a lot of extra testing and debugging to get the system going. As a result, Sibrava and Pikarski have fallen far behind schedule.

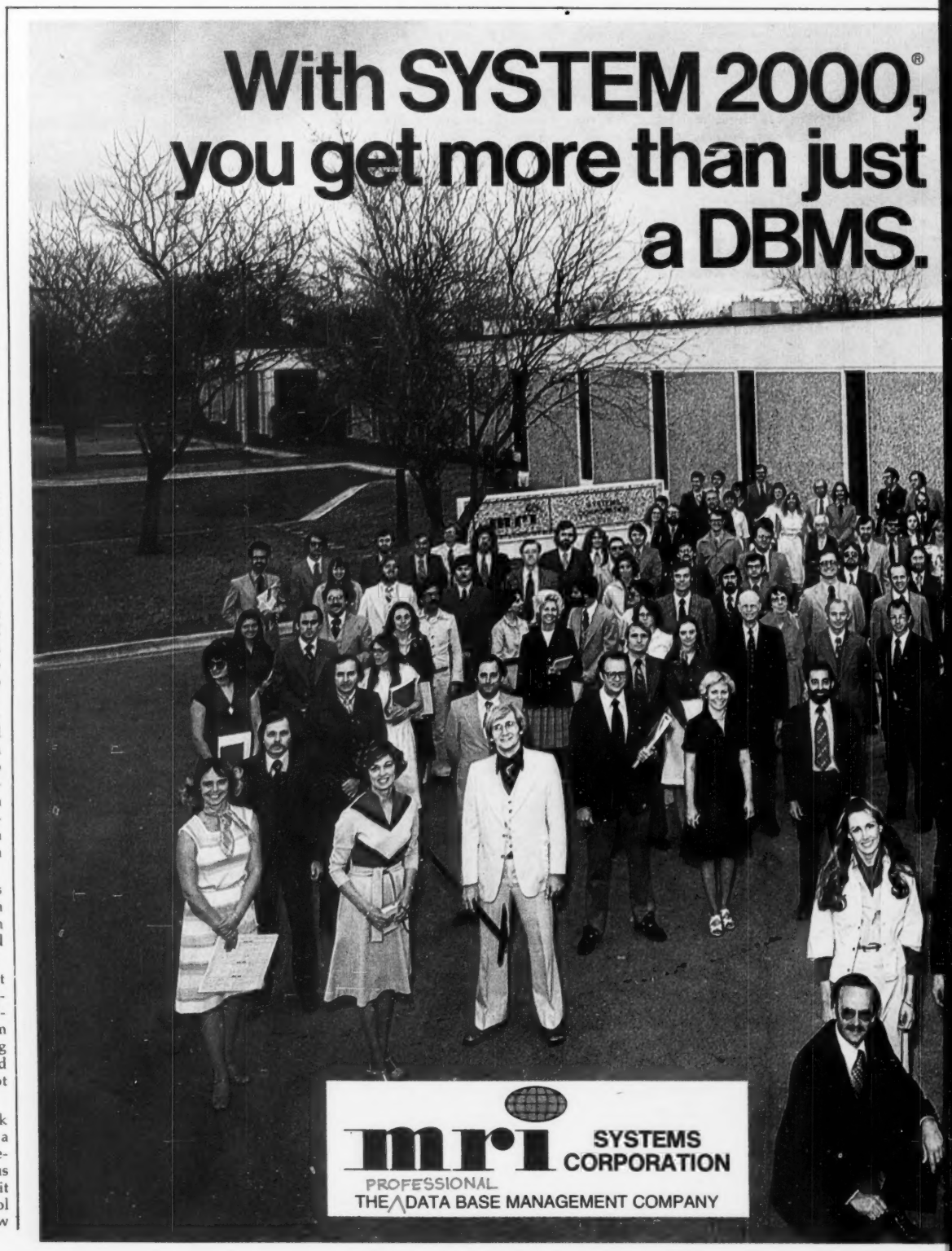
"There are customers waiting for the service, but even now that the system is up and running I'm hesitant to open for business because I want to be sure nothing more will go wrong," Sibrava said.

The complete system consists of seven micros hooked together. Each is assigned an individual task. One micro supports one software function and then turns the data over to the next micro for further processing. The system can handle quite a bit of data at a lower cost, he noted.

On looking back at his money-saving idea, Sibrava said, "I've learned a lot from this whole thing — the hard way."

One lesson he learned is that cost isn't everything; although there was a $5,000 difference between buying from the wholesaler and buying from the factory, the time and aggravation added up to a lot more, he said.

"I've also learned to check for references. We had done a little checking on the wholesaler, but he refused to give us any references, saying it wasn't worth his time to fool around with them. From now on we'll know better," Sibrava said.



Floppy Disk Available

Quay Unveils Desktop Unit

FREEHOLD, N.J. — Quay Corp. has unveiled the Model 90, a desktop microcomputer system reportedly suited for system development, personal computing or educational instruction.

The Model 90 includes the Quay 90MPS or 90F/MPS single-board microcomputer, a complete power supply for 50- and 60 Hz operation and a wood grain base with a protective cover.

Accessories for the system include a floppy disk subsystem compatible with Digital Research, Inc.'s CP/M operating system and an S-100 bus adapter for additional peripheral expansion.

A Model 90 housing a 90MPS micro with 4K bytes of dynamic random-access memory (RAM) costs $1,050; the unit costs $1,675 when housing the 90F/MPS with 16K bytes of dynamic RAM and a floppy disk interface. Quay Corp. can be reached at P.O. Box 386, Freehold, N.J. 07728.

West Coast Faire Seeks Participants

PALO ALTO, Calif. — The West Coast Computer Faire has issued a call for speakers, participants and demonstrations for its conference program.

The Fourth Faire will be held in San Francisco's Civic Auditorium May 11-13. Sponsors plan on 100 participants in the three days of conference sessions.

The Faire is mainly concerned with inexpensive computing for home, business and industry. Some sessions will be directed to users and address specific applications, while others will be of interest to business or technical microcomputer professionals, a spokesman said.

Those wishing to propose a talk or demonstration or organize a conference session should contact the Computer Faire, Box 1579, Palo Alto, Calif. 94302 as soon as possible.

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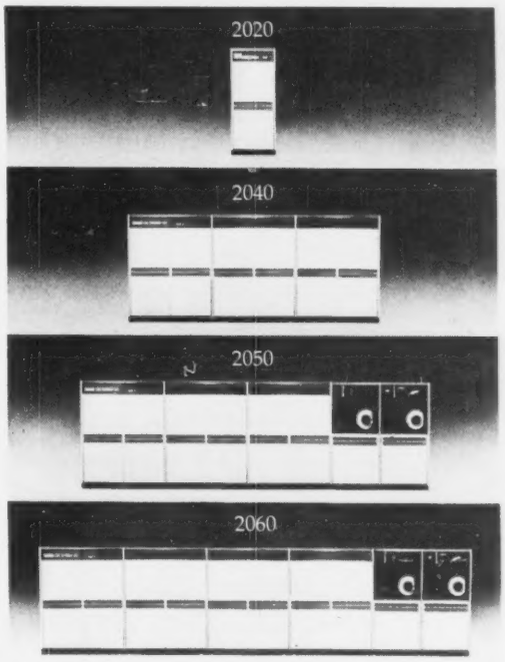

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Prior Approval Required

The 7% Exemption: There's a Hitch

By Marcia Blumenthal
CW Staff

Companies buoyed by the prospect of qualifying for an exemption from the 7% limit on salary increases because of shortages of DP personnel may experience a sinking feeling after they learn of a regulation recently issued by the Council on Wage and Price Stability.

The regulation requires firms to get approval from the council before raising salaries above the 7% cap. It has drawn vehement criticism from the American Electronics Association (AEA), the guiding light behind the original exemption regulation adopted by the council last month [CW, Dec. 25-Jan. 1].

AEA officials said the regulation would put a premium on noncompliance.

"If we are required to get prior approvals, then we could wind up with an absolute bottleneck of thousands of requests pending that never get acted on," Roy Brant, vice-president of human relations at National Semiconductor Corp., said. Brant chaired the special AEA task force that drafted the exemption regulation for the council.

However, the AEA reported just prior to press time that at least two members of the council's staff confirmed electronics engineers would be given blanket exemptions. The staff members refused to be identified, according to Kenneth C.O. Hagerty, AEA's vice-president for government operations.

An economist working for the council said she was unable to confirm any decisions on blanket exemptions and did not know if DP personnel were being considered for a blanket exemption.

Government Contracts

The prior approval regulation for exemptions applies to all companies with government contracts and large companies with revenues in excess of $500 million or with more than 1,000 employees.

Moreover, all firms — regardless of size — that "reasonably anticipate" receiving government contracts must adhere to the procedures for obtaining exemptions.

"The real program is to fight inflation throughout the economy, not just government contractors. The harder the government makes it on companies over which it has leverage, the fewer other companies will comply," Hagerty asserted.

"Both the uncertainty of receiving council approval and the time required to do so will place a premium on noncompliance," he added. "Prior approval will not work in a voluntary program. The only sanctions are for government contractors."

Companies that choose to ignore the program or are not currently required to apply for exemptions will be able to hire people away from companies trying to comply with the regulations, Hagerty lamented. Major defense contractors seeking to comply will be faced with the choice of protecting their pools of scarce talent or defying the guidelines, he predicted.

Hagerty estimated there are about 250,000 companies doing business with the government, a large proportion of which are in high-technology areas. The council underestimated the number of companies that will seek exemptions, he said.

Appeal Rejected

The prospect of a "bureaucratic morass" prompted the AEA to appeal to Barry Bosworth, director of the council, asking that only prior notification rather than prior approval be necessary before raising salaries above the 7% lid. This would allow the

(Continued on Page 77)

Itel Moving Into Software Arena Without Losing Hardware Emphasis

By Howard A. Karten
CW Staff

NEWTON, Mass. — Itel Corp., known primarily for its hardware products, will be expanding its operations into the software area in the coming year, according to James P. Gafke, executive vice-president of the company's Data Products Group.

In an interview here recently, Gafke said two recent moves — a reworking of the microcode for the IBM 370/145 and the introduction of the company's Prepso text editing system [CW, Dec. 25-Jan. 1] — represent the company's first steps in that direction.

"We are expanding into the software area by acquiring products through marketing rights arrangements, where we exclusively would distribute a product to the marketplace, probably with a royalty arrangement with a developer," Gafke stated. "We're finding an awful lot of products out there being developed individually that have fairly good applicability to the marketplace. So we see ourselves growing in that area of the business," he added.

Itel's plans do not mean it is abandoning its emphasis on hardware. The company expects to install "between 300 and 400 Advanced Systems" this year, Gafke said.

"We are continually working on enhancements to products in the Advanced Series line as well as products for both the high and low ends," he added.

That, along with a "large backlog" for the company's Model 7350 disk drives, will make 1979 a good year for Itel, he predicted.

Itel does relatively little product development, preferring instead to work with other companies such as National Semiconductor Corp. and Hitachi Ltd. in developing products. Itel's function in developing products is to make sure they meet the needs and requirements of the marketplace "as we see it," Gafke stressed.

Gafke was recently named to his position after serving as president of Itel's Computer Products Division. He attributed a large measure of the company's success to three factors: the motivation and background of Itel employees, the "horrendous elasticity" of the computer marketplace and the fact that most of the company's employees are engaged in administrative, sales and technical activities.

"I think IBM does a good job of hiring good people," Gafke said, estimating as many as 90% or 95% of the company's sales force has worked for IBM at some point prior to joining Itel. "There are a lot of things IBM does in hiring people that gives a synergistic effect . . . For instance, we spend very little time educating people before they're productive."

CW Photo by H. Karten
James P. Gafke

Gafke suggested both the nature of Itel's business and the nature of its employees have contributed greatly toward making the firm successful. "In the data

(Continued on Page 80)

Telefile Expecting $4 Million Loss

By a CW Staff Writer

IRVINE, Calif. — Telefile Computer Corp. is anticipating a loss in excess of $4 million for its latest fiscal year ended Sept. 30.

Although the company is currently in default of bank obligations, Telefile expects to make good on that debt by the time its first Sigma 85 computer is shipped, according to Samuel V. Edens, chairman of the board. Shipment of the equipment, equivalent to the Xerox Corp. Sigma 9 processor, is planned between April and June.

Edens hedged on isolating the reasons for the loss, but attributed a good portion of the company's poor financial performance last year to the development costs associated with the Sigma 85 computer line.

Telefile began developing its own computer products in 1976 after Xerox decided not to sell Telefile the licensing rights to its Sigma line. Telefile's computers are plug-compatible with and software-transparent to the Xerox Sigmas.

Aside from product development, Edens said, a general inventory write-down for products primarily in the Xerox line would contribute to the losses.

Moreover, he reported, the company's management has been concentrating on developing the computer line, neglecting the firm's traditional product line of peripherals for Xerox and Univac mainframes and minicomputer disk systems.

Management Changes

In order to balance the two product lines, Telefile has made management changes. Harold E. Eden, formerly chief executive officer, is now president of Telefile's computer operation. David T. Scott succeeded Eden as president and chief executive officer.

Scott, previously president of Interstate Electronics Corp. of Anaheim, Calif., is responsible for the day-to-day management of all operations other than computer products.

Edens said the company is planning either to establish a separate division or spin off a company for the computer products operation. However, the bank must approve any organizational changes.

Although no Sigma 85 products have been shipped yet, that model was announced about two years ago to assure Xerox users there would be replacements for their equipment. Market research performed by Telefile indicated the company would be able to sell about 105 computers to the existing Xerox base, which Edens claimed will keep the operation humming for the next two to three years.

Telefile's final reports for fiscal 1978 are expected to be available in two to three weeks.

Commission Begins International Trade Study

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The U.S. International Trade Commission (ITC) recently began a study of the trends in international trade in computers and integrated circuits.

The investigation coincides with congressional consideration of several multinational trade agreements now being worked out. It was requested by Senators Abraham Ribicoff (D-Conn.) and Adlai E. Stevenson (D-Ill.), chairmen of the Senate Subcommittee on International Trade and the Subcommittee on International Finance, respectively.

In a letter to the ITC requesting the investigation, the two senators asked the commission to focus on "factors affecting the present and future competitive position of U.S. producers of computers and integrated circuits."

Ribicoff and Stevenson said the study should include "data and analysis concerning foreign government involvement in the industry in the form of incentives to foreign producers and disincentives to U.S. entry into foreign markets and [should] compare such involvement with U.S. government policies affecting the computer and integrated circuit industry."

Emphasis on Japen

The emphasis of the investigation will be on Japanese activities in semiconductors, according to William F. Finan, staff member of the Senate Committee on Finance, the parent committee to Ribicoff's Subcommittee on International Trade.

"There is also some interest in what the British and Germans are doing. The Europeans have some very interesting programs under way in semiconductor development," he added.

In particular, the U.S. semiconductor industry is upset about what it views as lack of access to the Japanese market. "The main concern here is this is the area of the marketplace where the U.S. is supposed to have the greatest comparative advantage, and if the play of the market isn't working out so we are able to maintain competitiveness in Japan or in Europe, then the committees want to understand why," Finan declared.

The ITC investigation will also examine the amount of foreign ownership and investment in U.S. firms, particularly in smaller semiconductor companies.

"The high technology items are where our greatest export potential lies, so we are very concerned about what is happening in this area," Finan pointed out. "Are we going to lose our comparative advantage rapidly? Are we losing it because of market distortions or government intervention, or is some sort of evolution going on here [making the U.S. go along with the natural play of the market]?"

The investigation, which will last about nine months, will result in a report to the two Senate subcommittees, according to Ross Reynolds, commodity industry analyst with the ITC and one of the directors of the study.

If it is decided there is enough interest, the ITC will hold a public hearing in connection with the investigation sometime in the spring. In addition, the ITC has asked for written comments from "interested persons." Such comments should be submitted no later than July 2, the commission said.

Finan views the study as a means of "providing some factual information to the committees, which are trying to understand how governments are interacting with developments in these technologies, to determine their intentions and the implications for U.S. firms in terms of continued growth and continued technological advancement."

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Billings Acquires Disk Operation From Calcomp

ANAHEIM, Calif. — California Computer Products, Inc. has agreed to sell its small disk operation to Billings Computer Corp. The action completes the sale of Calcomp's Memory Products Division.

Xerox Corp., which recently purchased the bulk of that division for $25 million in cash, declined to purchase the disk operation, according to a Calcomp spokesman.

The total selling price is expected to be about $1.8 million, involving both cash and securities. The company would not comment on the proportion of cash and securities stipulated in the sales agreement.

The sale of the Memory Products Division was part of Calcomp's effort to improve its cash position [CW, Dec. 18]. The division, although profitable, was the only large separable entity of the company, the spokesman said.

Billings Computer, a subsidiary of Billings Energy Corp., will continue to supply disk drives to Calcomp's OEM customer base, he said. Calcomp does not expect to continue selling the product.

Roger Billings, president of Billings Computer, said the decision to purchase the floppy disk operation came after 18 months of very successful experience with Calcomp drives in Billings products.

The transaction is subject to the approval of the boards of directors of both companies, to negotiation of a definitive purchase agreement and to an audit of the assets to be transferred.

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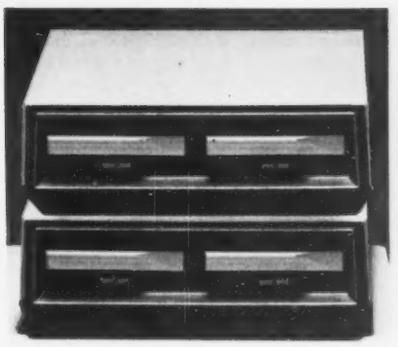

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Annual Growth of 20%

Services Industry Becoming Force in Europe

By Alan A. Benjamin
Special to CW

LONDON — The European computer services industry has grown 20% annually during the past five years and is showing signs of becoming a major European industrial force, regardless of the fact that it has long been considered insignificant compared with the hardware industry.

The services industry in Europe, unlike the hardware industry, is probably indomitable; it seems to be too late for the kind of domination that exists in hardware to occur.

The services industry is established and recognized. But above all, people, rather than manufacturing facilities, are its prime resource.

Brainpower cannot be monopolized, and young, intelligent people generally do not work very well in large packs. Smaller organizational groupings allow better cross-fertilization, more opportunities and increased chances of reward — qualities which, despite everything, are still very much alive in Europe. Notwithstanding the dominant socialist government apparatus in Europe, the computing services industry is still entrepreneurial in character.

In all areas except massive manufacturing capability, many innovations that occur in applications design, microcomputing software and computer-aided design and manufacture still emanate from this individualistic approach.

International News

Scope of Operations

There are approximately 3,300 computing services companies in Europe which employ more than 250,000 people and generate annual revenues of more than $4 billion, according to the 1977 European Computing Services Association (ECSA).

A sizable export business in more than 100 countries has been created with companies in the larger European countries, principally the UK and France. There is also a growing number of licensing and joint venture agreements between service companies in different countries.

The differing market shares of IBM in France and the UK as well as the long-standing indigenous manufacturing industry have required computer services companies to develop skills that span many kinds of equipment and computing languages.

Because Europe is a composite of several nations, the services companies have developed a market knowledge of business customs, applications, laws and facilities that are disharmonized and require flexible marketing and product strategies. That is one reason why the software package industry grew faster in the U.S. — an homogeneous marketplace allowed amorization over many customers.

European companies have had to cope with the potpourri of services, tariffs and laws offered by the postal, telephone and telegraph (PTT) authorities. Designing and optimizing cross-border networks in Europe is an art that requires much skill.

The industry's growth rate has been a consistent 20% during the past five years, with some sectors regularly improving at 40%. That growth rate has imposed managerial strain and a serious shortage of people in the industry.

But today, many professional managers have moved into the industry, organization is better and the companies are better capitalized. Fostering managers is now a key task for many chief executives in the industry, and it is felt that gradually the management shortage is being remedied.

The personnel shortage is another matter. Europe's demand for skilled software, operations and design staff will be huge. Furthermore, the computing services industry is fast becoming a graduate or equivalent industry, which means that it competes each year with other technologies and disciplines for the high-quality graduate.

A constructive attempt to interest dropouts and undergraduates (and equivalent) in the industry is now being made in the UK and France. Lectures and publications are all being used to provide details of careers in the industry, prospects for achievement and the industry's progress and future.

Computer Consciousness

In the UK, for example, the Computing Services Association (CSA) is launching a campaign with the universities and polytechnics to influence the content of the computing science courses to reflect more of the practical issues which arise in computing, such as project management, estimating and user interface problems.

In addition, the CSA will try to persuade other educational disciplines to increase the application of computing in their programs so that computing is eventually in the emerging graduate's consciousness.

On an organizational level, the industry has 11 national associations in Europe that are similar to the Association of Data Processing Service Organizations, Inc. (Adapso) in the U.S.

However, in Europe there are several supranational institutions that directly impact the computer services industry. The European Economic Community (EEC), the Council of Europe, the PTTs and the European Parliament are some of those entities.

All-Europe Group Necessary

After the first European computing services industry conference, held in Brussels in 1975, the associations of each country agreed a transEuropean association was necessary. Accordingly, Ecsa was formed in January 1976 to deal with both the supranational entities and the issues common to the services industry members in all nations, such as transborder data flow, standards and research and development. To date Ecsa has:

- Written a formal commentary on the EEC four-year program for DP.
- Submitted a position paper on PTT monopoly and tariffs to the EEC.
- Joined with the EEC in commissioning the "First Annual Survey of the European Computing Services Industry."
- Submitted a position paper, to the Council of Europe.
- Met with officials of the CSTD in Brussels to discuss relationships between the PTTs and the computing services industry.
- Joined an EEC working party to India to study relationships between Indian and EEC software companies.
- Taken observer status at the Consultative Committee on International Telephone and Telegraph (CCITT) in Geneva.

Last summer Ecsa organized the First World Computing Services Industry Congress in Barcelona, Spain, which was cosponsored by Adapso and the Japanese Software Industry Association.

Benjamin is the director general of Computing Services Association Ltd., the UK counterpart to Adapso.

Executive Corner

- Hark M. Vasa has been appointed vice-president of management and information systems at Decision Sciences Corp.
- Robert F. Ferrara has been promoted to vice-president and general manager of Dataproducts Corp.'s New England Division in Wallingford, Conn.
- Lucian D. O'Kelley has been appointed vice-president of marketing at the Business Services Division of Scientific Software Corp. Steven D. Parsons has been appointed vice-president of customer services.
- Phillip R. Troullos has been appointed vice-president of sales at Chase Computer Corp. and Jack F. Jordan has been appointed Northeast regional manager of the firm's newly opened Northeast Regional Office.

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STSC, Magnuson Reach Marketing Agreement

BETHESDA, Md. — Scientific Time Sharing Corp. (STSC) and Magnuson Systems Corp. will sell their products and services jointly. This does not mean, however, that Magnuson has been picked as the supplier of the Quad 100 systems STSC announced it will be offering early this year [CW, Dec. 11].

Under an agreement reached recently, each company will retain its own marketing and field support organization. Neither will actually sell what the other offers, "but we certainly will recommend each other's capabilities if they seem the right answer to our customers' needs," an STSC spokesman said.

He added that Magnuson's plug-compatible IBM 370/-138- and 370/148-class processors are still among the machines being considered for use as Quad 100s, but no final decision has been made on who the supplier will be.

Magnuson, of Santa Clara, Calif., manufactures and maintains the M80 processors [CW, May 22], which are plug-compatible with IBM 370 and Series 30 CPUs. STSC, headquartered here, provides remote computing services and sells and supports its proprietary APL Plus time-sharing system and applications for use on IBM-compatible computers.

STSC's largest application areas for remote computing services are in financial planning, analysis and reporting for large corporations. The company's software installed on customer premises is compatible with APL Plus, which can be used to test and develop customer applications prior to hardware installation.

STSC President Daniel Dyer emphasized that his company chose to work with Magnuson not only because of the advanced architecture of the M80, but also because of Magnuson's corporate commitment to customer service.

"Magnuson has a complete approach to the design, manufacture, installation and ongoing support of mainframe systems," Dyer said.

Magnuson's operations are conducted through eight regional field offices in the U.S. and through an affiliate in Europe. Its initial M80 models are in the intermediate IBM 370 power range. The M80s are field-upgradable to 16M bytes of memory and 16 channels.

STSC's central computer is accessed through a telecommunications network in 200 cities worldwide. The company's customers are supported through 15 offices in the U.S. and four in Europe.

Hitch Issued To 7% Rule

(Continued from Page 73)

council, at a later date, to monitor companies for compliance with the tightly defined criteria, according to the AEA.

Bosworth's response was unsympathetic, an AEA spokesman said. Bosworth indicated in recent statements that companies ignoring President Carter's inflation-fighting program will find their names on a public list of violators that will be published at the end of March.

Bosworth also reportedly said the list would be circulated to government agencies along with recommendations that contracts be withheld from the firms on the list.

Companies applying for approvals to raise salaries beyond the 7% lid have until Feb. 15 to submit requests. However, this deadline may be extended, an AEA spokesman said.

In order to receive a go-ahead for an exemption for a specific job category, firms must provide documentation showing that the number of vacancies for those positions, the time required to fill them and entry-level pay rates have increased substantially over the past two years. Firms must also document the proportion of the work force affected.

In addition, they must provide a statement that assistance in filling these vacancies has been sought from the local public employment service agency.

Priority for granting approvals will be given to job categories affecting more than 15% of a company's work force.

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W. Germany	6,527	7.9	3
United Kingdom	4,794	5.8	4
France	4,768	5.8	5
Canada	2,301	2.8	7
Italy	2,119	2.6	8
Australasia	2,044	2.5	9
Brazil	532	.8	17
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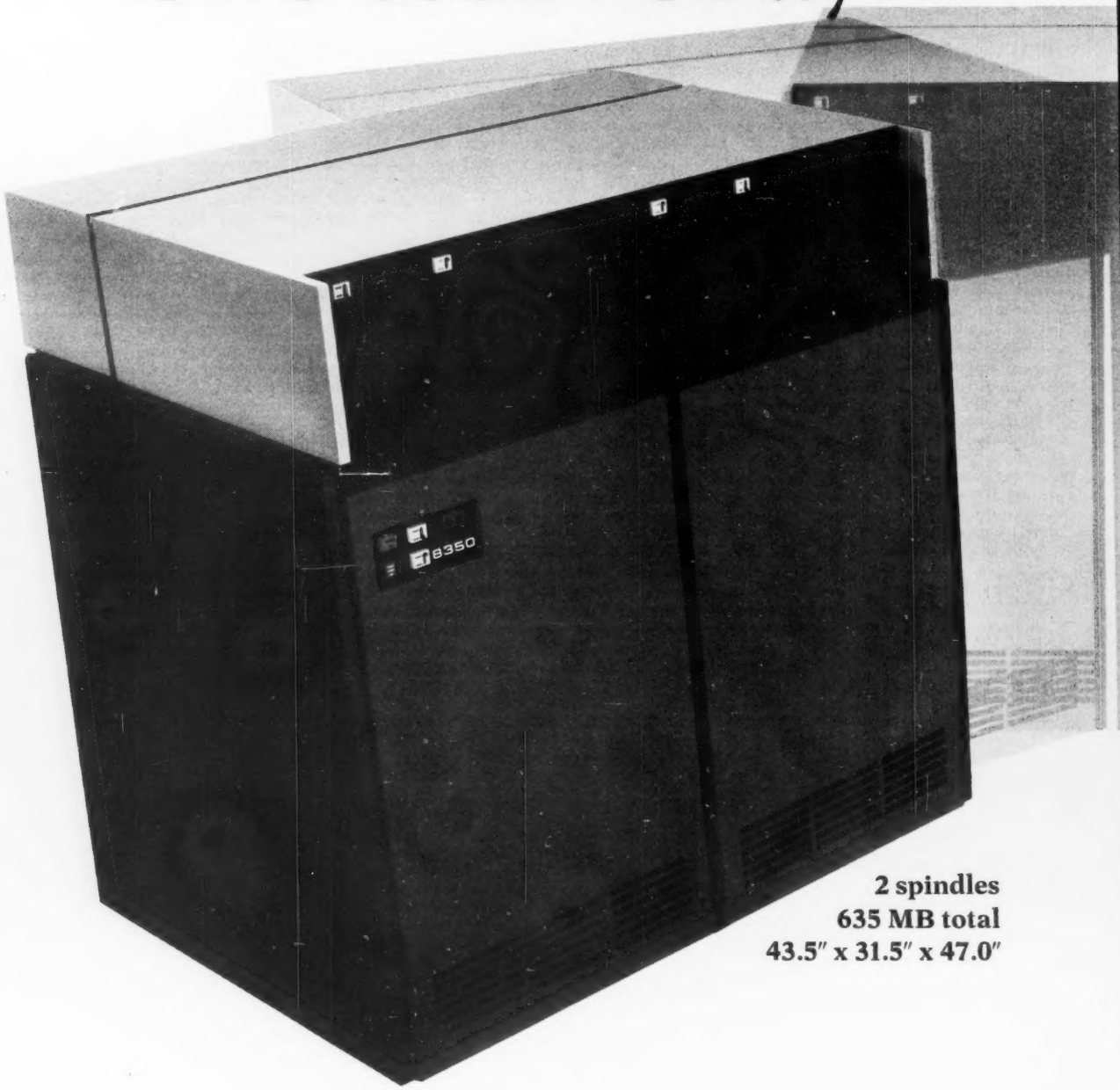
STC 8350 Today



2 spindles
635 MB total
43.5″ x 31.5″ x 47.0″

With our growth path, the 8350 investment you make today is more than protected tomorrow.

The STC 8350 Disk Drive has posted an enviable track record for high performance, reliability and significant cost savings. All noteworthy reasons why it's today's leading 3350-compatible disk drive. And now there's another very important reason why you should consider an 8350: longevity. You save money now when you buy the unit, and our growth path protects your investment against obsolescence because you can double the capacity of your 8350 at a future date. Without doubling your cost. Here's how:

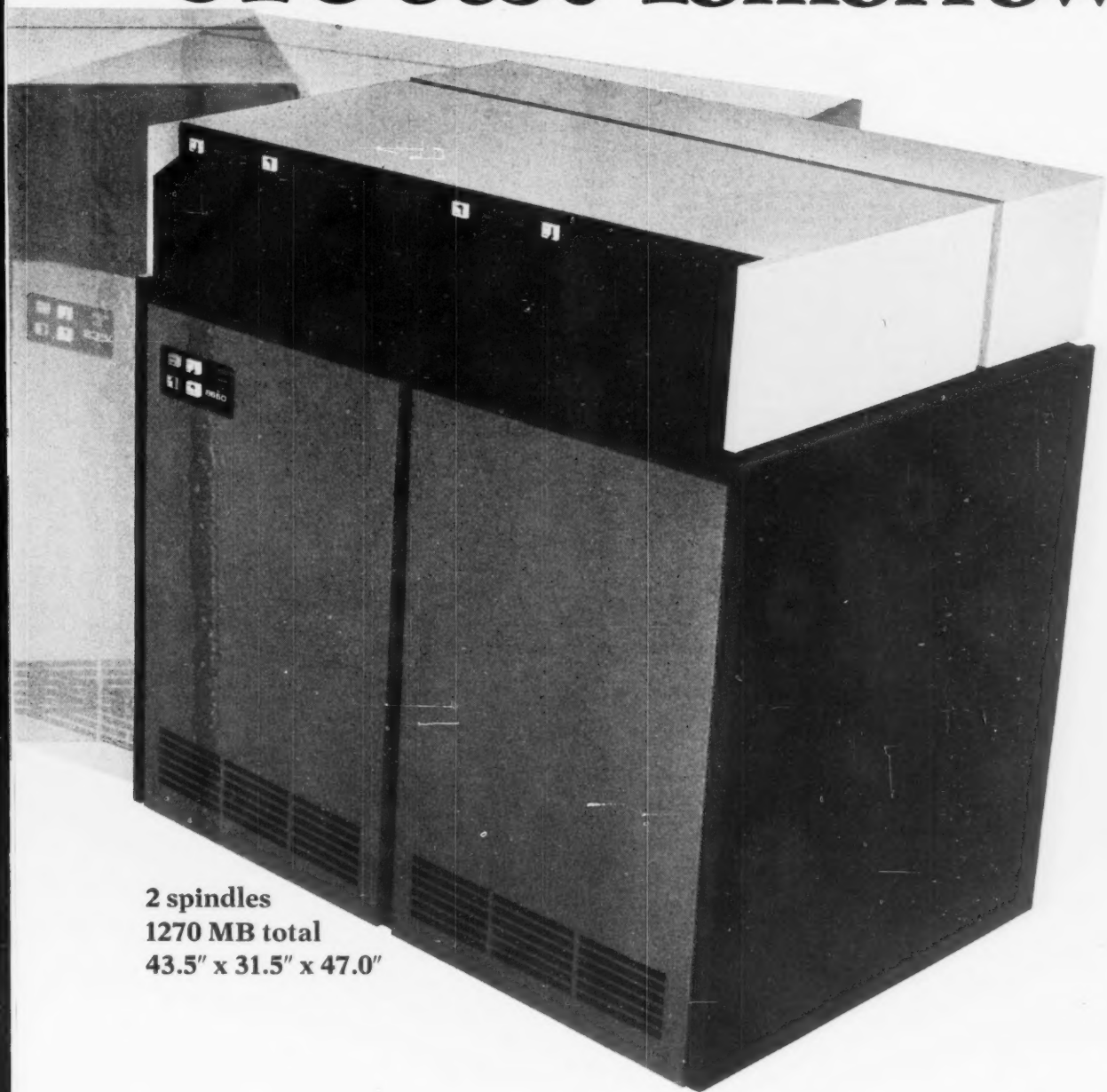
Increase your capacity. Lower your cost of ownership. In analyzing our customers' needs, we've found that most systems need added storage capacity. Some right now, some in the near future. Equally important, these customers have told us they'd like to add capacity without increasing their operating costs.

The 8650 has more than met their objectives. It offers 635 MB of data storage per spindle. Double the capacity, yet it fits in exactly the same floor space as the 8350, has similar air conditioning and power requirements, and has no added components that could reduce reliability. And best of all, you get all these benefits at a lower price per Megabyte: about 30% less than comparable single density storage.

When we designed the 8650, we also designed a logical growth path for 8350 users: your unit can be upgraded to 8650 specifications whenever expanding data storage needs dictate doubling capacity. On your site, and at a very reasonable cost. That's why owning an STC 8350 today will be like money in the bank tomorrow.

How we achieved Double Density. The 8650 is a natural outgrowth of our experience in the research, design and manufacturing of high-performance fixed media disk systems. The 8650 double density disk drive, like the proven 8350, is an evolutionary product of our continuing research in winchester technology. It incorporates all that we've learned about head/disk relationships, flight dynamics, servo mechanisms and magnetic materials while becoming the leading independent supplier of fixed media disk. This knowledge, coupled with the STC certification process of stringent testing and inspection, has

STC 8650 Tomorrow



2 spindles
1270 MB total
43.5″ x 31.5″ x 47.0″

enabled us to make double density a reality.

The STC 8650 is completely compatible with 3350 software support, and access time is equal to or better than a 3350. But that's where the similarities end. Our new head design improves read/write reliability at the new tighter track spacing. A newly designed servo system minimizes seek time and enhances data tracking accuracy.

Performance enhancements and configuration flexibility. The 8650 gives you your choice of string switch or dual port—a feature that improves access rate and availability for critical, high activity storage requirements. We've made the 8650 compatible with the STC 8000-II Control Unit, further protecting your investment and providing you with a high degree of flexibility. You can mix dual port and string switch units on the same 8000-II. And, strings of 8650's can be intermixed on the same control unit with strings of 8350's, 8100's, 8400's and 8800's up to a maximum of 64 volume addresses.

When you choose Storage Technology for your storage subsystems, you get more than a favorable price/performance balance. You get longevity—our assurance that a good investment today will be a protected investment tomorrow.

To learn more about STC 8350/8650 Disk Drives, including pricing and availability, call your local STC sales office. Or, clip and mail the coupon to Storage Technology Corporation, Mail Drop 3M, 2270 South 88th Street, Louisville, Colorado 80027. Phone (303) 497-6262.

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DTS Employees Enjoy Roman Holiday

MAYNARD, Mass. — When in Rome, some 950 Data Terminal Systems (DTS) employees may not have done what the Romans did, but they certainly made the most of their recent jaunt to the Eternal City, which was sponsored by the firm for achieving record earnings last year.

DTS, which claims to be the second largest supplier of stand-alone electronic cash register (ECR) and point-of-sale (POS) systems, spent between $500,000 and $550,000 to send more than 900 of its employees (including family members, in some cases) on a one-week Roman holiday, according to William Hallahan, vice-president of marketing.

At about $520 a head plus management costs, the trip was open to all employees from secretaries to top management, Hallahan said. The per-person price included air fare, hotel, continental breakfasts, two dinners, a banquet and visits to Pompeii, the Vatican, Old Rome and Florence.

Trip in Shifts

Employees traveled in shifts over three consecutive weeks, with the last shift reserved for inside sales personnel — sales/support staff, regional managers, major account managers — and individuals from 102 DTS dealerships across the country.

These 260 individuals earned the company-sponsored vacation because they met or exceeded quotas set for the year. "Those who made 125% of quota — about 120 people — could take a guest along free," Hallahan noted.

A 10-year-old company, DTS went public about three and a half years ago, but has set earnings records since its first year in business.

For the most recent nine-month fiscal period, DTS' net income was $9,823,594 — or $2.07 a share — on sales of $49,744,809. This compared with earnings of $4,397,636 or 94 cents a share and $29,722,129 in sales for the same 1977 period.

"This represents a 123% increase in net income per share and a 67% sales increase over 1977," according to Hallahan.

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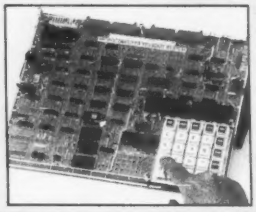

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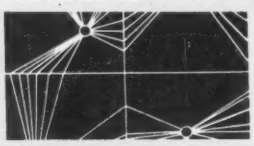

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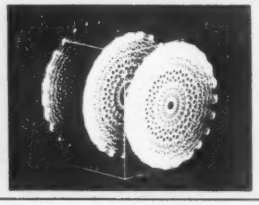

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LOS ANGELES
February 27-March 2
DALLAS
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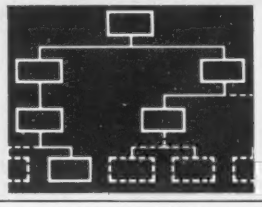

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NEW YORK
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DALLAS
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DETROIT
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WASHINGTON, D.C.
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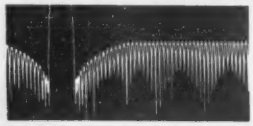

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DALLAS
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Itel Plots Move Into Software

(Continued from Page 73)

products area in the last few years, our voluntary terminations turnover rate has been less than 10% — perhaps even less than that," he estimated.

In Ideal Position

"The company is in an ideal position with such a high proportion of people engaged in administrative, financial, marketing or technical areas," he continued, "and everybody is pretty driven to achieve the next plateau." Gafke's view of Itel's employee satisfaction is in contrast with a recent U.S. Department of Labor report that cited generally high levels of job discontent throughout the country.

Gafke thinks Itel employees' high level of job satisfaction will mitigate "job shuffling," despite the company's intention of following President Carter's 7% ceiling on pay raises. He echoed Edson de Castro, president of Data General Corp., in declaring that computers represent a unique area of the economy because their prices are steadily dropping while the prices of other capital goods are rising.

However, Gafke stopped short of agreeing with de Castro that the DP field should be exempt from the President's guidelines.

Although the Itel Data Products Group has been known principally for its activity in the IBM-compatible mainframe area, Gafke indicated he does not necessarily plan to limit Itel's activities to that aspect of DP. "I'm sure distributed DP [DDP] is a trend, although I'm not sure I can define what it is, and [no two] people define it in the same way.

"We regard the minicomputer area of our business today to be progressing more and more toward DDP, and it is certainly our intent in the future to be able to market our systems with the minicomputers we have today to offer a total DDP system," he said.

Auerbach Covering Graphics Terminals

PENNSAUKEN, N.J. — A section providing comprehensive coverage of the graphics display terminal market has been added to the "Auerbach Business Minicomputer Systems Reports."

A subscription to the "Minicomputer Systems Reports" costs $325 annually. The price includes monthly updates, a telephone advisory service and subscriptions to "The Auerbach Newsletter" and the "Mini Observer Newsletter."

Auerbach Publishers, Inc. is located at 6560 N. Park Drive, Pennsauken, N.J. 08109.

OEM Cage Offered

WALTHAM, Mass. — A rack-mounted multibus card cage with slots for up to nine Multibus boards, power busing and bus signal terminators is available to OEMs from Computer Marketing, Inc.

Called the CC-80, the aluminum card cage provides for mounting the auxiliary connector and includes one cooling fan.

The single-unit price is $350, but OEM discounts are available, the company said from 257 Crescent St., Waltham, Mass. 02154.

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Univac Sees Strong '79 for Hardware Makers

BLUE BELL, Pa. — Although some economists have forecast a recession for this year or during the first half of 1980, Univac President Richard L. Gehring is predicting worldwide gross shipments of $17 billion for all computer hardware manufacturers in 1979. This represents a 13% increase from the $15 billion predicted for 1978.

However, Gehring noted these shipments would be down slightly from the 16% increase in shipments predicted for 1978 over 1977.

In his year-end summary and forecasts for 1979, Gehring said the effects of a recession on the computer industry this year would be offset by businesses making greater use of computers to improve their competitive positions.

"An increasing movement toward the distributed processing concept . . . will create a substantial demand for vendors," Gehring forecast. Moving in this direction, Univac will introduce its first products implementing its Distributed Communications Architecture, he stated.

Although Gehring pointed to distributed processing as a market opportunity, he said that "during 1979 we will be accelerating the introduction of products across the complete spectrum from large-scale to minicomputers."

Doubled Revenues Seen

Expecting revenues to pass the $2 billion mark for the first time in fiscal 1978, which ends March 31, Gehring said he anticipates a 20% growth in computer bookings, a 15% increase in revenues and improved profit margins for fiscal 1979. "We expect to double computer revenues over the next five years," he added.

Univac's concentration on application software for specific industry markets was a prime reason for its growth during 1978, according to Gehring. That emphasis resulted in a greater penetration of the firm's already established markets in manufacturing, airlines, energy, distribution and education, he claimed.

Gehring further attributed the company's growth this year to "excellent customer acceptance of the 1100/-80," the firm's largest system. Toward year-end 1978, the value of orders and installations of that product exceeded $550 million, he estimated.

Increase in R&D

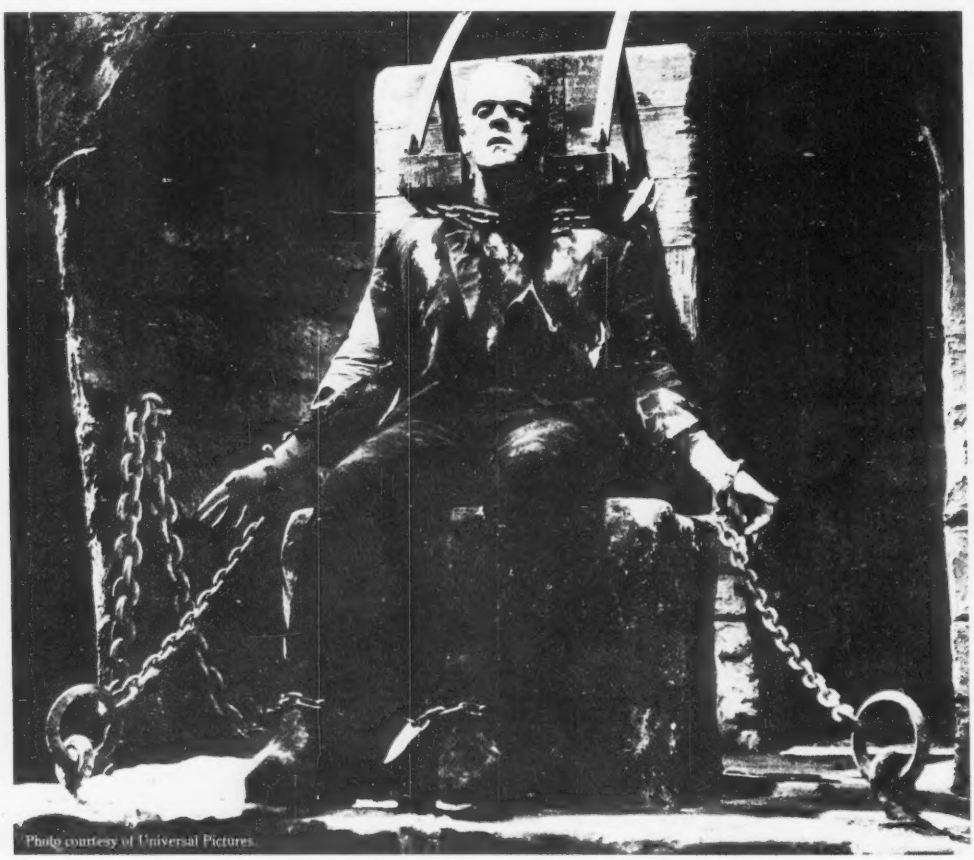
Pointing to Univac's research and development effort, Gehring cited a "technological breakthrough" in "what we believe was the first successful customer installation in the computer industry of a bidirectional data transmission link using a single fiber-optic cable."

Univac invested more than $150 million in R&D in 1978 and will increase that investment about 10% in 1979, Gehring noted. "A large proportion of this expenditure will be allocated to the development of specialized industry applications software," he explained.

On the international scene, Gehring noted the firm had established 19 sales offices in France, the UK and West Germany to market Univac's small business system.

Other significant international events were first major orders from the People's Republic of China and India.

Stateside, Univac will add 75,000 square feet to its Salt Lake City complex and will begin occupying a 400,000 square-foot site now being completed in Santa Clara, Calif., for the ISS disk drive development and manufacturing operations.



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CalComp's mini-peripheral sales reps won't ever tie you down to outdated equipment.

Without CalComp in the picture, finding up-to-date peripherals for your DEC or Data General mini can be a monstrous problem.

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CalComp mini-peripherals: Because who knows what evil lurks?

Memorex Forms Venture in Japan For Floppies

SANTA CLARA, Calif. — Memorex Corp. recently established a joint venture with Teijin Ltd. and Memorex Japan Ltd. to manufacture floppy disks.

Teijin Memorex Co. Ltd. is the first joint venture Memorex has entered into for its computer-related products, a company spokesman said.

Formed to meet the growing Japanese demand for flexible disk products, all of the output produced by the new firm will be sold in Japan.

Teijin, a diversified high-technology company with headquarters in Osaka, will hold a 51% interest in the venture. Memorex and its wholly owned Japanese subsidiary will own the remaining 49%.

Teijin, whose 1978 revenues totaled $1.4 billion, will supply employees and plant facilities for the new firm. Memorex will provide technology, manufacturing information, training support and the coating material required to manufacture the disks, and Memorex Japan will market the floppies and provide customer service.

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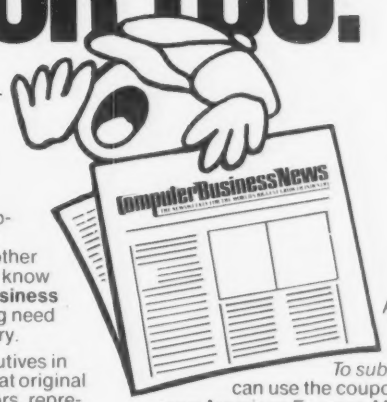

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Computer Business News is edited to serve key executives in management, engineering, production and marketing at original equipment manufacturers, systems houses, distributors, representatives, internal systems groups at sophisticated end user organizations, and other multiple unit buyers of computer products and services. According to International Data Corporation, the world's leading EDP market research firm, this marketplace is over $4 billion now, and should grow rapidly to $9 billion in 1981! So the need for good, up-to-date information is especially important.

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This material is researched and prepared by an experienced professional staff, led by Editor W. David Gardner, a well-known, respected computer industry reporter and analyst. Dave maintains editorial offices in New York and California, to make sure of complete, late-breaking coverage of both coasts – with his main office at 420 Lexington Ave., Suite 2354, New York City, NY 10017 (212) 867-5054.

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European Giros Give REI $15 Million Awards

DALLAS — Recognition Equipment, Inc.'s (REI) Swedish subsidiary has received two contracts worth more than $15 million for the use of REI's Trace system in Postgiros in Denmark and Sweden.

The Postgiros are organizations that provide postal and banking services. They will use the Trace system for high-speed document processing at rates up to 2,400 document/min, a company spokesman noted.

AB Recognition Industri, REI's Swedish subsidiary, will lease a system consisting of four basic computer subsystems and six transport subsystems with an if-purchased value of $8 million to the Post-og Telegrafvaesenet in Denmark. The equipment will be delivered through October of 1980, the spokesman said.

A similar contract, this one valued at about $7 million, was received from the Swedish Postgiro. Leased equipment is scheduled to be delivered through February 1980.

Other Awards

Hughes Aircraft Co. has been awarded a contract by the UK Ministry of Defense for the supply of advanced communications equipment that will be assessed against requirements for future communications systems for the Royal Air Force and Royal Navy.

Computer Sciences Corp. has received a $4.6 million contract to provide systems engineering support in the development of tactical systems for the U.S. Army.

Sweda International has received a three-year contract from Shopko, a division of Super Valu Stores, for the purchase and installation of Sweda 800/80 mass merchandise systems. The contract is valued at $3 million.

Contracts

Planning Research Corp. has been awarded a contract renewal from the U.S. Navy to continue micrographics personnel file maintenance services. The contract is valued at $3 million.

Recognition Equipment, Inc. has received a contract from the Federal Reserve Bank System for the purchase of 50 currency verification, counting and sorting systems which have an aggregate purchase price of $12 million.

Harris Corp. has been awarded a $4.5 million contract from Avis Rent-a-Car System, Inc. for the development of Wizard II on-line computer terminals. The terminals will upgrade and expand Avis' present telecommunications capacity at its car rental locations.

Univac and its Scandinavian joint-venture company, Saab Univac, have signed an agreement with Scandinavian Airlines System and Iberia Airlines of Spain to develop a material supply and inventory control system (Mats) to run on Univac's 1100/80 series computer systems. Both airlines will use Mats to control spare parts. SAS currently operates a Mats system based on Univac 494s.

Digital Equipment Corp. has signed a contract with System Development Corp. for delivery of 10 VAX-11/780 medium-scale systems. The contract is valued at $1.7 million.

Sweda International has received a $750,000 contract from McCrory Corp. for electronic cash registers in the nationwide chain of general merchandise stores. McCrory owns J.J. Newberry Co., H. L. Green Co. and McCrory/McClellan chains.

Alphatron, Inc. has been awarded a contract of more than $300,000 by System Development Corp. for the design and development of custom LSI devices.

Lear Siegler, Inc. has entered into a contract with Educational Data Systems (EDS). Under the contract, Lear Siegler will have access to EDS' Interactive Real-Time Information System (Iris) software package. Iris will be offered in conjunction with Lear Siegler's recently introduced VDP-1000 business system.

Decision Data Computer Corp. has been awarded a contract for approximately $1 million by the Department of Defense for the purchase of card communications terminal equipment.

The Graphics Division of Systemhouse Ltd. has been awarded a contract valued at approximately $800,000 by the U.S. Geological Survey, an agency of the Department of the Interior. The contract calls for the delivery of three systems to mapping centers.

Paradyne Corp. has received a lease contract from Tennessee Building Products for implementation of a PIX-II "virtual data link." The three-year contract is valued at $39,600.

Computel System Ltd. has signed a major contract with Yamaha Motors Canada Ltd. of Toronto. Under the terms of the contract, Computel will provide on-line services for Yamaha's order entry, invoicing, accounting and inventory control applications.

Genasys Systems, Inc. has received contracts valued at $325,000 from Shell UK Ltd. for the rights to the System Development Generators developed by Genasys. Shell will be installing the software worldwide.

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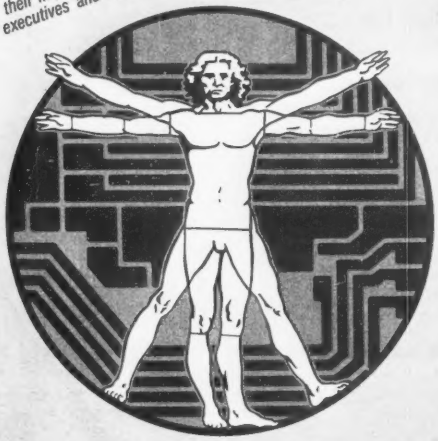
DELTAK's User Conference will spotlight advanced computer technologies. Explain their significance. Show you their implications for trainers, executives and end users.

You'll hear five eminent authorities – James Martin, Dr. Jerry Weinberg, Michael Jackson, Ed Yourdon and William Oncken – present their views on the requirements needed to obtain the productivity yield these technologies offer.

At concurrent sessions, you'll meet and exchange ideas with other trainers, explore and discuss alternative training strategies, techniques and results.

And you'll have ample time to examine DELTAK's newest products in the data processing and management development disciplines - powerful resources DELTAK is providing to help you manage and control developing trends in data processing technology into the 1980's.

Registration Fee: $150 registration fee will cover all sessions for the two days plus receptions, breakfasts and lunches.



MAIN TENT SPEAKERS

The world's most articulate speaker in the field of advanced data processing technologies, **James Martin**, is a leading author of books on data processing, data base, telecommunications and distributed data processing. Mr. Martin is currently working with DELTAK on the development of the Advanced Technology Library.

William Oncken received rave reviews for his presentation of Performance Management at the 1978 Conference. President of the William Oncken Corporation, Mr. Oncken is a well-known authority on management topics.

Lecturer, author and consultant, **Ed Yourdon** is President of Yourdon Inc. and the author of DELTAK's Structured Programming Series. He is an authority on program design and on-line computer systems.

Michael Jackson, Director of Michael Jackson Systems Limited – London, is an internationally known authority on Structured Techniques for computer program design and implementation.

Gerald Weinberg is widely known as an author, researcher, consultant and teacher. Mr. Weinberg has written articles for numerous publications and is the author of the world-famous book, **Psychology of Computer Programming.**

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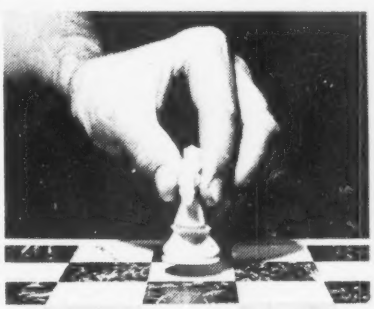

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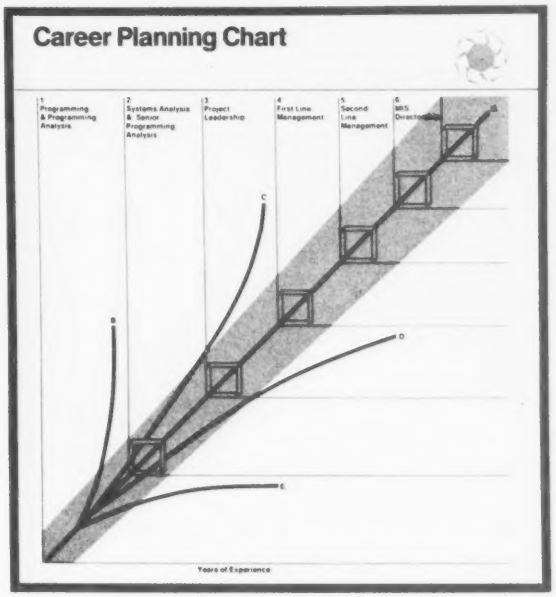
New 1979 Computer Salary Survey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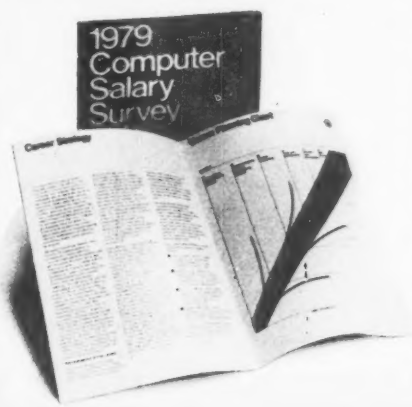

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Transcomm is developing a number of vertical markets in which specially tailored version of the Tolas-II system will be sold. Positions are immediately available for both Product Line Managers and senior level Programmer Analysts. PLMs will be responsible for product development and for coordinating team efforts with Transcomm's Marketing and R&D Departments. Candidates should be thoroughly familiar with on-line order processing, inventory, and general accounting systems, and should have recent experience in project management. An inclination toward marketing is particularly important.

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Trinity University
San Antonio, Texas

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Trinity University was founded in 1869, and is now located on a beautiful 100 acre campus in San Antonio. Enrollment is approximately 3600 students. San Antonio is widely recognized as one of America's unique cities. Population is approximately one million persons. San Antonio has a warm climate and is noted for its scenic beauty, places of historical interest and diverse cultural influence.

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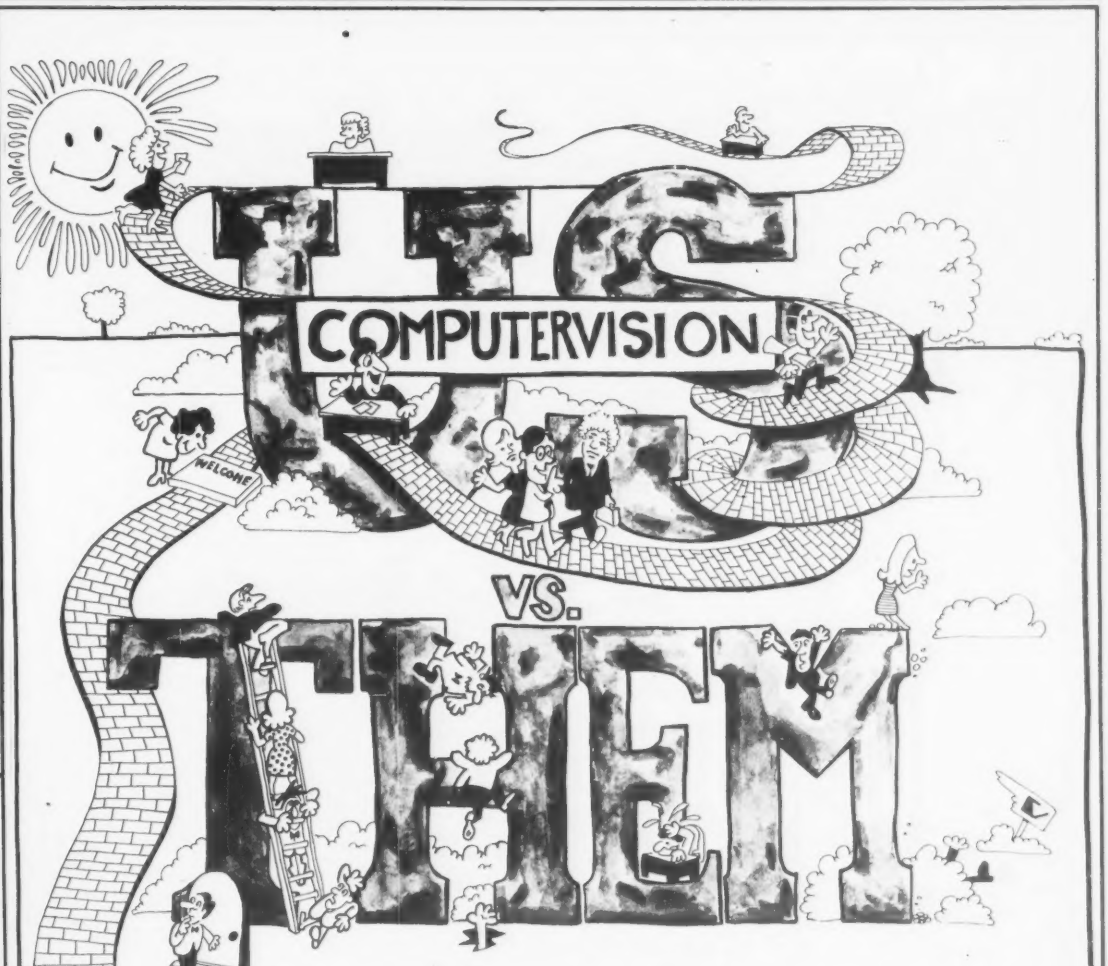

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For immediate and confidential consideration, please call collect to Mr. Ronald B. Smith, President, at (604) 479-7117, or send your resume to him at:

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Dr. Ben Douglas Gay
Acting Director
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Bucknell University
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DEC 11/70 installation scheduled for April 1979. Our client requires an individual with MUMPS programming and system design experience to join the management team in the newly created D.P. manager position. You will direct conversion from service bureau and D.P. staff. Applications are order entry, inventory, billing, accounts rec. Northern N.J. location. Excellent compensation. A ground floor opportunity with a successful distribution company. Please forward your confidential resume which must include salary history to Consultant, Box 898, Bryn Mawr, PA 19010. Equal Opportunity Employer.

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You should have experience performing validations and acceptance testing, test definition and planning of systems and subsystems of newly developed computer software. Ideal candidates should be experienced in analyzing system design, and be able to define test requirements.

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- 1-2 years' experience in setting up, operating and monitoring an IBM computer
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ITEL

RCA

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ITEL Field Engineering Division

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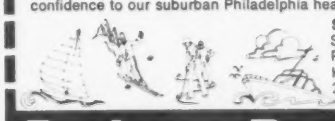

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Boston, MA 02116
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Programmer Analysts
Systems/Analysts

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On the go. At North American Van Lines, it's our business. To you, it means a search for career advancement. Our large on-line system has openings for highly skilled individuals that could be just the move to provide that advancement.

PROGRAMMER ANALYST

You are a degreed professional or have the equivalent experience. You have technical training with emphasis on programming, system design and software application and at least 2-4 years of Data Processing experience. IBM and HP systems including TOTAL, ENVIRON/I and DOS/VS experience would be beneficial. With these qualifications, you will make improvements of processing techniques which will result in more timely, accurate and efficient systems; as well as analyze, isolate and solve production program problems as they arise using available software tools.

SYSTEMS ANALYST

This position requires you to properly define user problems and develop the most feasible solution for an efficient and effective automated and/or manual system. You'll also be responsible for designing systems while working directly with user. To qualify, you must have a Bachelors degree (Accounting, Mathematics, Engineering, Business or Computer Science preferred) or experience, at least 4-6 years Data Processing experience and technical training with emphasis on project management, design and implementation.

These positions require good oral and written communication skills as well as a total commitment to excellence and precision. North American Van Lines recognizes skills and dedication and has the salary and benefit package to prove it! For immediate consideration, please send your resume, with salary history, or call, in confidence, to:

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data processing

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Our success and growth have resulted in an exceptional career opportunity for you if you've been honing your MVS, JES3 or VTAM skills by doing, and now desire to take the next step in the "learn-do-teach" cycle. Join the growing software instruction team at Amdahl and learn why so many people say that teaching is the most fun they've had in their DP careers.

SOFTWARE INSTRUCTORS

We currently have openings at our Sunnyvale, California headquarters for qualified professionals ready to take that next step. We invite you to send your resume in confidence to Phil Beckhelm, Professional Employment, Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, CA 94086. If you're not quite ready or need more information, please call 408/746-6165. We'll be happy to talk with you. We are an equal opportunity employer.

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We're an international leader in the fluid power industry . . . a 55 year old, Fortune 500 firm. We're seeking qualified EDP specialists with excellent communications skills (written and oral), and experience in programming, systems design and analysis.

EDP AUDIT MANAGER

Will be responsible for planning, conducting, and managing EDP audits. At least 3 years of EDP auditing experience is required. Accounting experience hepful.

EDP AUDITOR

Guided by our EDP Audit Manager, will be responsible for conducting EDP audits. At least 6 years data processing experience is necessary. This should include programming and systems design and analysis.

Salary is commensurate with experience. Both positions require some travel.

Please send resume including salary history to: Barbara Behn Deeds, Parker Hannifin, 17325 Euclid Ave., Cleveland, Ohio 44112.

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Parker

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The new micro-based business system currently being introduced by our client, an electronics division of a Fortune 500 company, can introduce a new level of success to your career. If you're an ambitious marketing representative with a proven track record in selling minicomputer-related products, an opportunity exists for you in one of these cities: Detroit, Cincinnati, Pittsburgh, Philadelphia, Washington D.C., Dallas.

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An undergraduate degree (BS) would be an asset. A Computer Science degree would insure a competitive edge.

Wang Laboratories, Inc. offers competitive salaries and benefits. Please send your resume and salary history to Steven N. Fontaine, Professional Recruiting, Wang Laboratories, Inc., One Industrial Avenue, Lowell, MA 01851. or call him at (617) 851-4111.

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PROCEDURES AND TRAINING SPECIALISTS

United Airlines has immediate vacancies at it's San Francisco Univac 1100 Computer Center for experienced Procedures and Training Specialists.

Customer Support Specialist

Requires ability to act as an interface with Maintenance Operations Center customers and the Applications Programming staff. Ability to identify and solve problems is essential. Experience on IBM 360/370 and/or Univac 1100/40/80 desired. Strong background in written and verbal communications also desired.

Applications Support Specialist

Individuals filling these vacancies will provide consultation services to applications programmers through all stages of product development and maintenance. Primary responsibilities include the preparation of ECL runstreams, operator procedures and flowcharts. A background which includes operations and programming experience, preferably in Univac systems is desired.

United has excellent fringe benefits and is an equal opportunity employer.

Interested applicants should send resume with salary history to Milt Williams - SFOKM, United Airlines, San Francisco International Airport, San Francisco, CA 94128.

UNITED AIRLINES

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IBM 360/370, System/3 Mini Systems

SORBUS, INC., a leader in EDP equipment maintenance, has immediate openings, NATIONWIDE for highly skilled Field Engineering professionals.

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If you are interested in working for a progressive company and want a bright future, please write or call TOLL FREE:

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MAI

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SYSTEMS DEVELOPMENT TRAINING SPECIALIST

This new position will provide an opportunity to design and implement a broad training and career development program for our Systems Development staff. The technical environment includes: MVS, COBOL, IMS, MARK IV, PANVALET, and TSO.

The professional we are seeking should have a degree plus 3 or more years' experience in Data Processing applications, of which one year should ideally be in teaching or training. Familiarity with video-assisted instruction and courses in management applications would be very desirable.

We are Plough, Inc., the consumer products division of Schering-Plough Corporation based in Memphis, Tennessee. This is your opportunity to join our billion dollar NYSE listed organization, which provides an excellent salary, and growth opportunities, plus an extensive benefits package.

Send your resume with salary history in strict confidence to: A. Coleman, Professional/Executive Recruiter

Plough, Inc.
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Personnel Department
P. O. Box 377 C
Memphis, Tenn. 38151

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Saxon Business Products, Inc., a major Miami headquartered leader in the expanding photocopier industry is currently seeking professionals for its expanding MIS department. Continued growth has necessitated the upgrading of our hardware and software to support our Distribution, Marketing, Manufacturing and Financial groups. Honeywell Level 66 experience desired although a Honeywell 2000 background combined with a willingness to upgrade one's technical skills would be considered. We have a GCOS operating system utilizing DM IV software; IDS II data base, NPS, TPS and Cobol 74. We also will utilize the Level 6 in a distributed processing environment.

SYSTEMS ANALYSTS
Business applications experience in order processing, financial and inventory systems.

PROGRAMMER ANALYSTS
Two to three years of Cobol programming experience in Marketing, Manufacturing of Financial areas. While the majority of our openings are for Level 66 experienced candidates, we can accommodate a limited number of Honeywell 2000 or IBM experienced personnel desirous of learning our new software systems.

TECHNICAL SUPPORT ANALYSTS
Experienced in providing vendor software support, hardware/software problem analysis, programming/operations support and establishing technical requirements. Must be experienced in Honeywell GCOS operating system and/or NPS.

Saxon offers an excellent starting salary, comprehensive company paid benefits including a complete paid relocation to the Miami area. Send resume and salary history (a must) in confidence to:

Angela Smith
Personnel Specialist
Saxon Business Products, Inc.
13900 N.W. 57th Court
Miami Lakes, FL 33014
An Equal Opportunity Employer M/F

saxon

Arizona State University Systems Support PDP 11

Arizona State University Computer Services operates multiples PDP-11/70's under RSTS/E and IAS. Plans to interface these systems to our large IBM system are in the early stages of development. We are looking for a senior person with several years experience. To supervise these systems. Pay commensurate with experience, Application deadline 26/-January/79. Submit application to personnel department, ASB 310, Arizona State University, Tempe, Arizona, 85281. This is a sensitive position and requires a criminal record check of the successful candidate. Equal Opp/Aff Action Employer.

SYSTEMS ANALYST
SALARY 15,000 -$17,000/YR

Cochise College in Douglas, Arizona is in need of a person to analyze & develop applications for a wide variety of business and educational uses. Bachelors degree in business or computer science, 5 years of experience, preferably in a college environment. Must possess the ability to communicate effectively with both computer systems practitioners and lay-users. Apply before January 30, 1979 to Personnel Office, Cochise college, Douglas, AZ. Equal Opportunity Employer.

REAL-TIME 360/370 BAL PROGRAMMERS

AVIS has an immediate need for outstanding individuals to work in its Garden City, New York headquarters. Successful candidates must have 1-3 years 360/370 BAL experience. PARS or other on-line application exposure preferred.

We offer starting salaries commensurate with your experience, plus excellent company benefits. For immediate, confidential consideration, please forward your resume, including salary history and requirement, to:

CAROL TROMBA, Personnel (No phone calls, please).

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SYSTEMS ANALYST

This position requires 2 years EDP Systems Development experience in a wholesale, retail or accounting environment.

PROGRAMMER

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TELECOMMUNICATION MANAGER

Minimum 5 years experience managing a telecommunications function, preferably within a Corporate operation. Emphasis on voice communications. Dimension System recently installed in our new Corporate headquarters which will interface ,with Albertson's operations throughout the U.S.,

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If you are an Information Systems professional looking for immediate challenge, send your resume, including salary history, in confidence, to ALBERTSON'S INC., P.O. Box 20, Boise, ID. 83726.

Call COLLECT for more information to Sue Noack, Employment Manager (208) 385-6397.

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SYSTEMS PROGRAMMER/ANALYST

Strong Univac 1100 systems programming/analysis experience is required. A previous background in internal operating systems and/or TIP/CMS is preferred.

APPLICATIONS PROGRAMMER/ANALYST

Experience in evaluation of user requirements and performance of unit and system tests using FORTRAN desired. A college degree in Computer Science or Mathematics will be accepted in lieu of experience. Applications involve flight scheduling, flight planning computation, monitoring of aircraft, air freight accounting, etc.

COMPUTER PERFORMANCE EVALUATION ANALYST

A technical degree coupled with experience in performance analysis or systems programming required. Ability to conduct performance analysis of hardware, software and applications for Univac 1100/80 systems including determining systems capability, development of effective long range replacment/upgrade strategies, and optimization of equipment through tuning and reconfiguration will be required.

In addition to exceptional growth potential, United offers an unparalleled benefits package that includes life, accident, sickness and dental insurance as well as free and reduced rate air transportation privileges. For consideration send a resume in confidence or call collect:

Ray W. Peacoe, Emplomemt Manager
(312) 952-4715
Mon.-Fri. 9AM-5PM (CST)

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Works primarily with users from the academic community to design and program applications on a DEC system-1070 computer, and to assist in the administration and analysis of research data bases. Requires 2 to 3 years' solid applications programming experience in FORTRAN. Ability to communicate with technical and non-technical users.

College degree preferred.

Send resumes to:
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Harvard Business School,
Soldiers Field,
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JOVIAL EXPERT $28-$33,000+

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Your role in this service-bureau atmosphere will include operating system generation, installation, development, modification, maintenance, performance measurement and tuning.

You must have 2 years' large-scale operating systems experience, preferably in a business application, and general programming experience.

Call John W. McCarthy, collect, at (617) 258-2678. Or send your resume to him at The Charles Stark Draper Laboratory, Inc., 555 Technology Square, Cambridge, Massachusetts 02139.

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Corporate level position with Fortune 100 Co. in large Midwest city, to —

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* Develop skills criteria, career paths
* Coord. & admin. training
* Interface with college recruiting
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Requirements are:

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* Prior EDP teaching/training exp.
* Familiar with EDP training vendors

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St. Louis, MO 63105
(314) 727-1535

Product Sales Specialist

Tektronix, one of the world's fastest growing electronics companies, is continuing to expand its share of the market in automatic test equipment. This growth has created a challenging opportunity for a sales specialist who will develop and implement product sales plans for this major Tektronix product line. This position requires interaction with many levels of the customer's management. The product and markets demand an adept business sense in addition to technical knowledge. Experience in product marketing and electronics sales is required.

For immediate consideration please call George Evans TOLL FREE 800-638-4052 (Maryland residents call collect (301) 948-7151) or forward your resume to his attention in complete confidence:

TEKTRONIX, INC.
2 Research Court
Rockville, MD 20850
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For reasons of confidentiality, if your current employer is an attending company, we will notify you immediately.

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You'll be totally responsible for: (1) overall management of an entire College/University computer center, (2) insuring complete client satisfaction and (3) identifying/securing new business opportunities within the client's environment.

To qualify you MUST be bottom line oriented, be capable of autonomous action, possess extensive experience and knowledge of the EDP environment, have a proven distinguished background in academic/administrative computing at the management level.

SCT will provide the successful applicant with:

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SYSTEMS & COMPUTER TECHNOLOGY CORP

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DIRECTOR INFORMATION SYSTEM

The Cincinnati Health Department is seeking a Director of Information Systems to plan and direct the operations and development of the Department's management information system. Reports directly to the Assistant Commissioner of Health (Administrative Services). Has overall responsibility for data processing systems, equipment and staff. Must have a Bachelor's degree plus eight years of significant systems experience. Must have competence in the following areas: project management, third generation (or equivalent) equipment, systems analysis and design, programming, and cost evaluation. Excellent fringe benefits and salary (Range: $24,324 $36,180).

Send resume to **Staffing & Payroll Office, Cincinnati Health Department, 3101 Burnet Avenue, Cincinnati, Ohio - 45229.**

SYSTEMS ANALYST

Armour Dial has immediate opportunity for an individual with approximately 2-4 years programming experience in a real time, multi-programming environment. This new position is an integral part of a state-of-the-arts data acquisition, control, and management information system being installed in our food operation. A computer degree is desirable but proven experience is the key.

Responsibilities will include real-time operating systems enhancement and maintenance, systems analysis and software systems consultant to members of the computer systems department. Some application programming in Fortran and/or assembly language may also be required.

This position located in the pleasant river community of Ft. Madison, Iowa offers challenge, visibility and the opportunity to work with a team of aggressive professionals. You are invited to submit a resume and salary requirements specifying hardware and software experience in assured confidence to:

Employee Relations Supervisor

ARMOUR DIAL COMPANY
P.O. Box 1427
Ft. Madison, IA 52627
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FLORIDA OPPORTUNITY

Large Florida Wholesale Grocery Distribution Complex has immediate openings for several Programmer/Analysts and Systems Programmers.

Programmer/Analyst positions require on-line design and COBOL programming experience using CICS. Experience must have been in applications such as order processing, purchasing, billing, accounts payable and receivable. Structured Programming experience desirable, but not required.

Systems Programmer position requires a minimum of 2 years experience in the maintenance of DOS/VS Operating System CICS, and other supporting software. Experience in BAL and COBOL is required. Experience in IBM Series/1 would be a plus.

Positions offer an excellent salary and a challenging opportunity in a warm rural environment.

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Programmer

Programming experience in Cobol, working knowledge of DL/1 and CICS environment is desirable.

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Applicants should have a minimum of three years of solid experience in systems analysis and design with financial systems. Experience with the development of a standard cost and labor reporting system is a definite plus.

Excellent salary and company paid fringe benefits. Send resume and salary requirements in confidence to:

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SYSTEMS ANALYST

$1,381 - $1,624/mo.

Develop and administer data processing system and automation plan. Requires college education in industrial engineering & data processing related fields. **Resumes to Personnel Director, City of Vancouver, Box 1995, Vancouver, WA 98663 by 1/31/79.**
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Systems Analysis	Hardware
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Software Programming	MIS
Data Base Architecture	Methods and Procedures

Individuals will be involved in state-of-the-art consulting projects in a choice of locations. Company offers a performance oriented compensation package with excellent fringe benefits and opportunities for advancement.

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Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 300, Dublin Hall
1777 Walton Road
Blue Bell, Penna. 19422
(215) 629-0595

RSVP SERVICES
Employment Agency for Computer Professionals

PROGRAMMER ANALYST

Downtown Boston professional service organization is seeking applicants with several years' of programming experience. Other qualifications are working knowledge of hardware, good interpersonal skills, IBM system III familiarity and RPG II language preferred.

Please send resume and salary requirements to:

CW Box 1809
797 Washington Street
Newton, MA 02160

Programmer Analyst

PL/1, On-Line

New department of established national organization offers a "ground floor" opportunity to a qualified candidate with 2 or more years PL/1 experience; knowledge of DOS/VS; willingness to meet the challenge of developing a wide variety of "people oriented" on-line applications. Excellent benefits include liberal vacation policy. Please send resume with salary history in confidence to Personnel Director.

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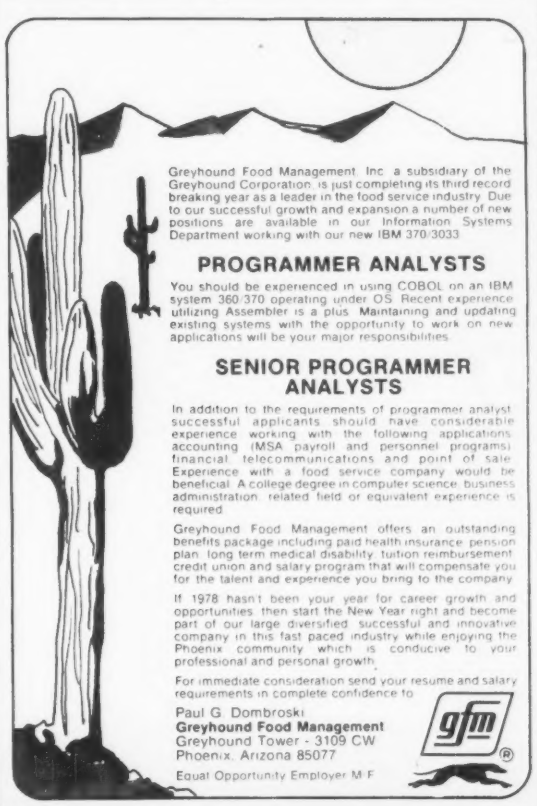

Greyhound Food Management, Inc. a subsidiary of the Greyhound Corporation, is just completing its third record breaking year as a leader in the food service industry. Due to our successful growth and expansion a number of new positions are available in our Information Systems Department working with our new IBM 370/3033.

PROGRAMMER ANALYSTS

You should be experienced in using COBOL on an IBM system 360/370 operating under OS. Recent experience utilizing Assembler is a plus. Maintaining and updating existing systems with the opportunity to work on new applications will be your major responsibilities.

SENIOR PROGRAMMER ANALYSTS

In addition to the requirements of programmer analyst, successful applicants should have considerable experience working with the following applications: accounting (MSA, payroll and personnel programs), financial, telecommunications and point of sale. Experience with a food service company would be beneficial. A college degree in computer science, business administration, related field or equivalent experience is required.

Greyhound Food Management offers an outstanding benefits package including paid health insurance, pension plan, long term medical disability, tuition reimbursement, credit union and salary program that will compensate you for the talent and experience you bring to the company.

If 1978 hasn't been your year for career growth and opportunities, then start the New Year right and become part of our large diversified, successful and innovative company in this fast paced industry while enjoying the Phoenix community which is conducive to your professional and personal growth.

For immediate consideration send your resume and salary requirements in complete confidence to:

Paul G. Dombroski
Greyhound Food Management
Greyhound Tower - 3109 CW
Phoenix, Arizona 85077

Equal Opportunity Employer M/F

atex

TOP PROFESSIONALS ARE KNOWN BY THE COMPANY THEY KEEP

We're ATEX, only five years old yet already a leading producer of large computerized text, editing and composition systems. The expertise and capabilities of our professional staff are recognized and respected throughout the publishing and printing industry. These positions are in new groups which are being formed within ATEX.

MANAGER ADVERTISING MANAGEMENT SYSTEMS

We need an individual to lead a group of several systems and applications programmers in the development of a newspaper page dummying system including a transaction oriented display ad data base, automatic ad placement and pyramiding and an interactive graphic correction terminal. The individual we are looking for will have experience in minicomputer systems and applications programming for turnkey systems. Design and development of transaction oriented data base systems is desirable along with use of assembly language and high level language, especially PASCAL. Some supervisory experience desirable.

MANAGER EDITORIAL PAGINATION SYSTEMS

We need an individual to lead a group of several systems and applications programmers in the development of an interactive graphics system for the layout and pagination of a newspaper utilizing PDP-11 minicomputers and state-of-the-art 16 bit microprocessors. The individual we are looking for will have experience in mini-computer systems and applications programming for turnkey systems. Interactive graphic programming desirable along with use of assembly language and high level language, especially PASCAL. Some supervisory experience desirable. Publishing industry experience is a plus.

SENIOR DATA BASE ANALYST

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PROGRAMMER/ANALYST

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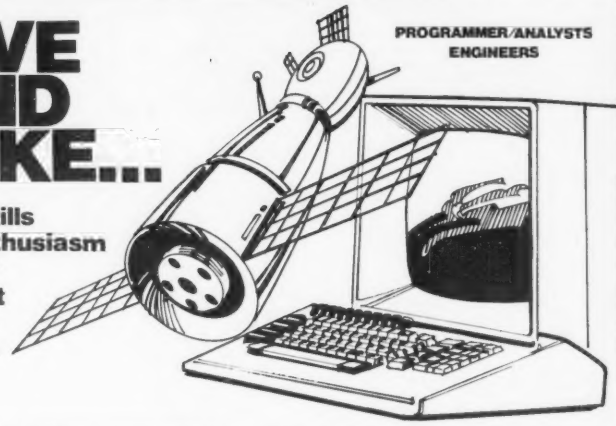

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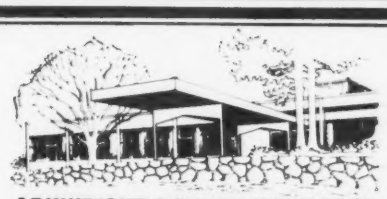

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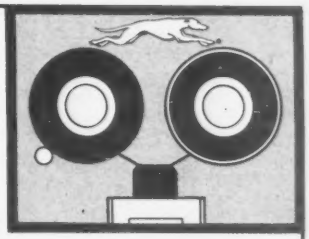

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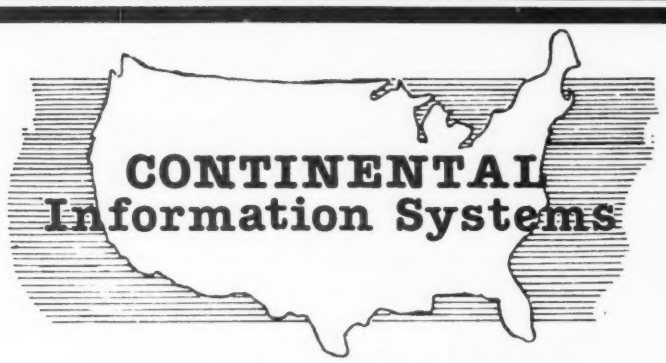

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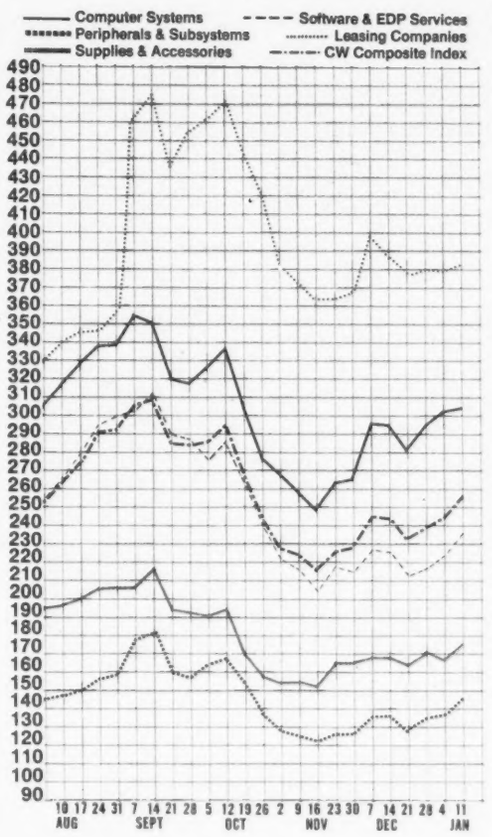

Earnings Reports

NATIONAL DATA
Three Months Ended Nov. 30

	1978	a1977
Shr Ernd	$.20	$.17
Revenue	10,782,000	8,655,000
Earnings	895,000	748,000
6 Mo Shr	.40	.33
Revenue	21,319,000	17,330,000
Earnings	1,793,000	1,446,000

a-Restated.

ADVANCED MICRO DEVICES
Three Months Ended Dec. 24

	1978	1977
Shr Ernd	$.55	a$.27
Revenue	39,128,000	23,725,000
Earnings	2,739,000	1,114,000
9 Mo Shr	1.52	a.77
Revenue	104,102,000	64,743,000
Earnings	7,498,000	3,188,000

a-Adjusted to reflect 50% stock distributed in September 1978.

COMPUTER MICROGRAPHICS
Three Months Ended Nov. 30

	1978	1977
Shr Ernd	$.15	$.10
Revenue	3,730,998	2,693,512
Earnings	179,250	113,688

MEASUREX
Year Ended Nov. 30

	1978	1977
Shr Ernd	$2.60	$1.65
Revenue	88,541,000	64,123,000
Earnings	8,763,000	5,357,000
3 Mo Shr	.71	.48
Revenue	26,374,000	18,499,000
Earnings	2,439,000	1,585,000

SCIENTIFIC TIME SHARING
Three Months Ended Nov. 30

	1978	1977
Shr Ernd	$.14	$.19
Revenue	3,951,000	3,211,000
Earnings	212,000	275,000
6 Mo Shr	.28	.35
Revenue	7,693,000	6,206,000
Earnings	425,000	519,000

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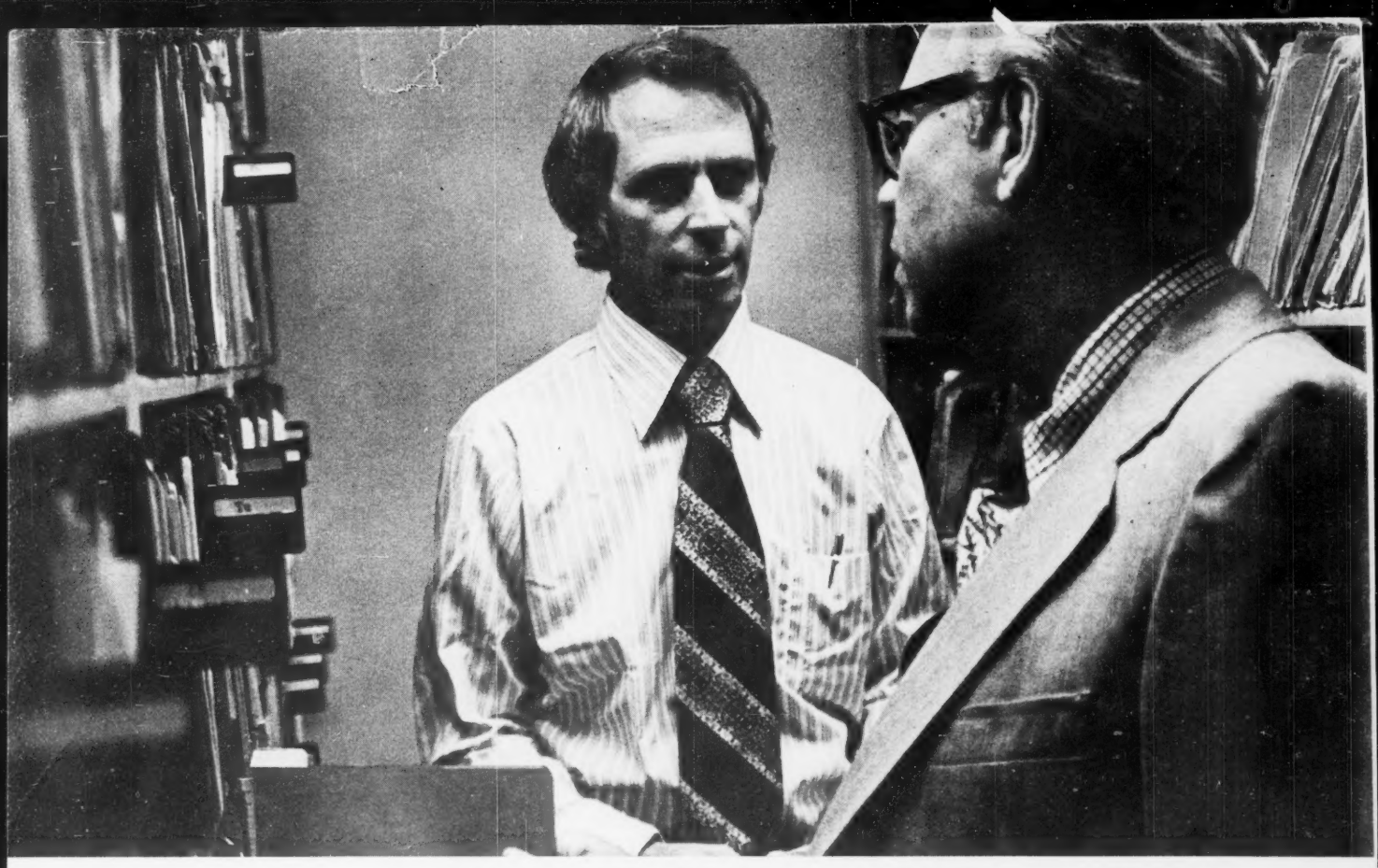
Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JANUARY 10, 1979

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

EXCH		1978-79 RANGE (1)	CLOSE JAN 10 1979	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	AMDAHL CORP	28- 69	48 3/8	-2 5/8	-5.1
N	BURROUGHS CORP	59- 87	73 3/4	-1	-1.3
O	COMPUTER AUTOMATION	15- 44	23 1/2	-1	-4.0
N	CONTROL DATA CORP	23- 44	35 1/8	- 1/4	-0.7
O	CRAY RESEARCH INC	8- 33	30	- 1/2	-1.6
N	DATA GENERAL CORP	42- 71	63 1/4	+ 7/8	+1.4
N	DATAPOINT CORP	34- 75	70 3/8	-1 1/2	-2.0
N	DIGITAL EQUIPMENT	39- 56	55	+ 1/2	+0.9
N	ELECTRONIC ASSOC.	2- 13	6 3/4	- 1/4	-3.5
A	ELECTRONIC ENGINEER.	9- 19	12 1/4	+1 1/4	+11.3
N	FOUR-PHASE SYSTEMS	19- 46	33 3/4	+ 1/4	+0.7
N	FOXBORO	28- 40	33	0	0.0
O	GENERAL AUTOMATION	7- 26	18	+ 3/4	+4.3
O	GRI COMPUTER CORP	1- 3	1 1/4	0	0.0
N	HEWLETT-PACKARD CO	62- 93	88 3/8	-3	-3.2
N	HONEYWELL INC	43- 73	72 1/4	0	0.0
N	IBM	236-310	305 3/8	-1 1/8	-0.3
O	MANAGEMENT ASSIST	9- 29	19 1/2	+1	+5.4
O	MANUFACTURING DATA S	9- 23	21 1/8	+ 7/8	+4.3
O	MICRODATA CORP	10- 23	19	0	0.0
O	MINI-COMPUTER SYST	4- 8	4 1/2	+ 1/4	+5.8
O	MODULAR COMPUTER SYS	7- 17	15 1/8	+1	+7.0
N	NCR	37- 67	63	+ 3/4	+1.2
N	PRIME COMPUTER INC	20- 43	32	0	0.0
N	PERKIN-ELMER	17- 30	29 1/2	+1 3/8	+4.8
N	SPERRY RAND	33- 49	45 7/8	+ 1/8	+0.2
A	SYSTEMS ENG. LABS	11- 24	15	+ 3/4	+5.2
O	TANDEN COMPUTERS INC	13- 37	27	+1	+3.8
A	WANG LABS.	12- 32	30 3/4	+ 3/8	+1.2
	LEASING COMPANIES				
O	BOOTHE COURIER CORP	13- 21	19 3/4	-1 3/4	-8.1
O	COMDISCO INC	5- 22	17 1/2	- 1/4	-1.4
A	COMMERCE GROUP CORP	1- 1	1/8	0	0.0
A	COMPUTER INVSTRS GRP	1- 7	3 1/2	+ 1/2	+16.6
O	CONTINENTAL INFO SYS	5- 15	6 1/2	- 1/4	-3.7
N	DATRONIC RENTAL	1- 3	1 7/8	+ 1/8	+7.1
A	DCL INC	3- 5	4 3/8	0	0.0
N	DPF INC	8- 14	11	+ 7/8	+8.6
N	ITEL	16- 36	26 3/4	0	0.0
N	LEASCO CORP	24- 36	35 5/8	+ 1/8	+0.3
O	LEASPAC CORP	1- 4	2 3/4	- 1/8	-4.3
A	PIONEER TEX CORP	3- 7	3 1/8	- 1/8	-3.8
N	U.S. LEASING	13- 20	15 3/8	+ 1/2	+3.3
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 2	7/8	- 1/8	-12.5
O	ANACOMP INC	8- 22	12 1/2	+ 3/4	+6.3
A	APPLIED DATA RES.	8- 17	12 1/2	+ 7/8	+7.5
N	AUTOMATIC DATA PROC	24- 36	30 1/8	- 1/8	-0.4
O	COLEMAN AMERICAN COS	1- 2	1/2	0	0.0
O	COMPU-SERV NETWORK	5- 12	7 1/4	+1 3/4	+31.8
O	COMPUTER HORIZONS	1- 9	6 1/2	+ 1/2	+8.3
O	COMPUTER NETWORK	6- 16	7 1/2	+ 1/2	+7.1
N	COMPUTER SCIENCES	8- 17	12 1/2	+1 1/8	+9.8
O	COMPUTER TASK GROUP	1- 4	5	0	0.0
O	COMPUTER USAGE	2- 4	2 1/2	+ 1/4	+11.1
O	COMPUT AUTO REP SVC	4- 10	7 1/8	- 1/4	-3.3
O	COMSHARE	6- 19	16 1/2	0	0.0
O	CULLINANE CORP	14- 33	19	+1 1/2	+8.5
O	DATA DIMENSIONS INC	4- 9	5	- 1/8	-2.4
O	DATATAB	1- 2	3/4	0	0.0
N	ELECTRONIC DATA SYS.	15- 25	18 1/2	- 5/8	-3.2
O	INSYTE CORP	1- 3	1	0	0.0
O	IPS COMPUTER MARKET.	2- 3	3	0	0.0
O	KEANE ASSOCIATES	3- 6	4 3/4	+ 1/4	+5.5
O	KEYDATA CORP	1- 3	2 1/4	+ 3/4	+50.0
A	LOGICON	10- 19	12 1/2	+ 1/2	+4.1
A	NATIONAL CSS INC	15- 36	27 5/8	+1 3/8	+5.2
O	NATIONAL DATA CORP	7- 13	9 1/8	+ 1/2	+5.7
A	ON LINE SYSTEMS INC	12- 30	18 7/8	- 1/8	-0.6
N	PLANNING RESEARCH	4- 10	6 1/8	0	0.0
O	PROGRAMMING & SYS	1- 1	1 1/8	0	0.0
O	RAPIDATA INC	3- 7	4 7/8	+ 5/8	+14.7
O	REYNOLDS & REYNOLD	18- 36	27 1/2	+ 3/4	+2.8
O	SCIENTIFIC COMPUTERS	3- 9	7 1/2	+1 5/8	+27.6
O	TYMSHARE INC	18- 33	31	0	0.0
A	URS SYSTEMS	5- 8	6 7/8	0	0.0
N	WYLY CORP	1- 7	5 3/8	+ 3/4	+16.2
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	14- 32	23 1/4	+1 1/4	+5.6
O	ADVANCED MEMORY SYS	7- 18	13 3/4	0	0.0
N	AMPEX CORP	10- 19	14 7/8	+ 1/4	+1.7
O	ANDERSON JACOBSON	5- 10	6 1/4	+ 3/8	+6.3
N	APPLIED DTG DATA SYS	9- 22	10 3/4	- 3/8	-3.3
O	BEEHIVE INTL	3- 7	4 3/8	+1 1/2	+52.1
A	BOLT,BERANEK & NEW	6- 14	11 7/8	- 1/8	-1.0
N	BUNKER-RAMO	10- 20	18 1/4	+2 1/4	+14.0
A	CALCOMP	3- 13	6 3/8	+ 3/8	+6.2
O	CAMBRIDGE MEMORIES	3- 9	4 7/8	+ 1/4	+5.4
N	CENTRONICS DATA COMP	16- 37	30 1/2	+1 1/2	+5.1
O	COGNITRONICS	1- 4	1 1/2	0	0.0
O	COMPUTER COMMUN.	6- 87	7	+1 5/8	+30.2
O	COMPUTER CONSOLES	4- 10	7 3/4	0	0.0
A	COMPUTER EQUIPMENT	3- 6	4 5/8	+ 1/2	+12.1
O	COMPUTER TRANSCEIVER	1- 3	4 3/4	+ 1/4	+5.5
O	COMPUTERVISION CORP	9- 30	25 3/4	- 1/4	-0.9
O	COMTEN	9- 38	21 1/4	+5 1/2	+34.9
N	CONRAC CORP	13- 26	14 3/4	0	0.0
O	DATA ACCESS SYSTEMS	3- 14	10 1/4	0	0.0
O	DATA 100	9- 20	19 1/2	0	0.0
A	DATA PRODUCTS CORP	14- 25	17 3/8	+ 1/8	+0.7
O	DATUM INC	2- 6	3 1/8	- 1/4	-7.4
O	DECISION DATA COMPUT	2- 6	3 7/8	+ 5/8	+19.2
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
A	DOCUMATION INC	6- 34	21 5/8	- 5/8	-2.8
O	DATARAM CORP	8- 32	18	+ 1/2	+2.8
N	ELECTRONIC M & M	4- 9	4 7/8	0	0.0
O	FABRI-TEK	1- 2	1	0	0.0
O	GENERAL COMPUTER SYS	1- 3	2	- 1/4	-11.1
O	GENERAL DATACOMM IND	9- 21	14 1/2	+1	+7.4
N	HAZELTINE CORP	10- 17	13 1/8	+ 1/2	+3.9
N	HARRIS CORP	17- 36	31 1/2	+2	+6.7
O	INFOREX INC	6- 11	7 3/4	+1	+14.8
O	INFORMATION INTL INC	7- 12	9 1/2	+ 1/2	+5.5
O	INFOTON	1- 3	3 1/8	+ 3/8	+13.6
O	INTEL CORP	39- 62	54 1/2	+2 1/2	+4.8
A	LUNDY ELECTRONICS	4- 8	5 3/8	+ 7/8	+19.4
O	MSI DATA CORP	10- 19	13 1/8	+1 1/2	+12.9
N	MEMOREX	27- 59	32 3/8	+1 5/8	+5.2
N	MOHAWK DATA SCI	6- 15	9 3/8	+ 3/8	+4.1
O	OMEX	2- 6	5 1/2	0	0.0
O	PARADYNE CORP	9- 17	12 3/8	+2 1/8	+20.7
O	PENRIL CORP	5- 12	10 1/8	+1	+10.9
N	PERTEC CORP	9- 17	11 7/8	- 1/8	-1.0
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	QUANTOR CORP	2- 5	2 3/4	0	0.0
O	RECOGNITION EQUIP	7- 13	8 1/2	+ 3/4	+9.6
O	SCAN DATA	1- 5	2 5/8	+ 3/8	+16.6
N	STORAGE TECHNOLOGY	19- 46	32	- 7/8	-2.6
O	T BAR INC	11- 20	17 3/4	+ 1/2	+2.8
O	TALLY CORP.	4- 14	13 3/4	0	0.0
A	TEC INC	6- 13	7 3/8	+ 3/8	+5.3
N	TEKTRONIX INC	33- 51	50 3/4	+1 3/8	+2.7
N	TELEX	3- 9	6	+ 1/4	+4.3
O	TESDATA SYSTEMS CP	9- 23	12 1/4	+2 3/4	+28.9
O	WILTEK INC	1- 2	3/4	0	0.0
	SUPPLIES & ACCESSORIES				
A	AMERICAN BUS PRODS	6- 11	8	+ 7/8	+12.2
O	BALTIMORE BUS FORMS	2- 4	4	0	0.0
A	BARRY WRIGHT	14- 34	32 1/4	+1 1/2	+4.8
O	CYBERNATICS INC	1- 1	5/8	0	0.0
O	DUPLEX PRODUCTS INC	13- 30	16 1/4	+ 1/4	+1.5
N	ENNIS BUS. FORMS	8- 17	13 1/4	+ 3/4	+6.0
N	3M COMPANY	43- 66	64 3/4	+1 1/8	+1.7
O	MOORE CORP LTD	26- 34	28 1/2	+1	+3.6
N	NASHUA CORP	18- 37	23 3/4	0	0.0
O	STANDARD REGISTER	20- 27	24	+ 1/2	+2.1
A	TAB PRODUCTS CO	8- 16	13 1/2	+2 1/2	+22.7
N	UARCO	19- 51	50 3/4	+ 1/4	+0.4
A	WABASH MAGNETICS	10- 22	15 1/2	+ 7/8	+5.9
N	WALLACE BUS FORMS	18- 33	24	+1 3/8	+6.0

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR



William G. Garrett
Assistant VP-data processing.

B. David Hinkle
Senior VP-human resources.

Crawford & Company couldn't wait until 1980 for a payroll/personnel system.

InSci delivered in 1978.

In early 1978, fast-growing Crawford & Company set up a human resources division. The Atlanta-based insurance adjusting firm needed a payroll/personnel system on its System/370 computer—fast. Senior VP-human resources Dave Hinkle turned to DP first.

"I said it would take at least two years to develop a combined system in-house," claims assistant VP-data processing Bill Garrett. "Crawford & Company couldn't wait that long. So Dave and I turned to InSci—and had a system in seven months. Believe me, that was fast.

"The system is excellent. Before we had separate files for payroll, insurance, retirement and what few personnel records were kept. Now we have one complete employee data base, one interface between payroll and personnel. And the data is readily available—without any systems or programming involvement."

Adds Dave Hinkle, "It has great value for the company. For one thing, our growth is somewhat based on mobility. We have 770 offices. If we need to find the right person for a new adjuster-in-charge location in Terre Haute, we can access complete records, right down to years of experience, courses taken and rooms of furniture to be moved."

"It was a team effort," says Garrett. "InSci worked with us every step of the way. I definitely feel it was the right decision for Crawford & Company."

Choosing InSci can be the right decision for you, too. For many reasons. We have 50 of the Fortune 100 as clients. And human resources is our only business.

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InSci

Innovators in people management